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ARGONNE NATIONAL LABORATORY

Laboratory Animal Science

A Review of the Literature

April

May

June

1966

LABORATORY ANIMAL
INFORMATION CENTER

Biological and Medical
Research Division

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LABORATORY ANIMAL SCIENCE

A Review of the Literature for April,
May, and June 1966

Abstracts 124-468

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Laboratory Animal Information Center
Biological and Medical Research Division

November 1966

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INTRODUCTION

Several new journals have been added to the list of those being reviewed. Issues of these newly added journals received during the first quarter of 1966 plus issues of all listed journals received during the second quarter (a total of 1,236 issues) were reviewed for this report. They contained approximately 22,000 articles of which 345 are related to laboratory animal science. These 345 articles were abstracted and form the basis of this report.

Also added in this issue is an author index. -- *R. J. Flynn.*

JOURNALS REVIEWED

- | Journal | Journal |
|---|---|
| <i>Acta Allergologica</i> (Copenhagen) | <i>American Midland Naturalist</i> (Notre Dame) |
| <i>Acta Anaesthesiologica Scandinavica</i> (Aarhus) | <i>American Naturalist</i> (Tempe, Arizona) |
| <i>Acta Anatomica</i> (Basel) | <i>American Review of Respiratory Diseases</i> |
| <i>Acta Biochimica Polonica</i> (Warsaw) | (Baltimore) |
| <i>Acta Biologica Academiae Scientiarum</i> | <i>American Zoologist</i> (Utica) |
| <i>Hungaricae</i> (Budapest) | <i>Anaesthesia</i> (London) |
| <i>Acta Biologica et Medica Germanica</i> (Berlin) | <i>Anatomical Record</i> (Philadelphia) |
| <i>Acta Chirurgica Academiae Scientiarum</i> | <i>Anesthesia and Analgesia, Current Researches</i> |
| <i>Hungaricae</i> (Budapest) | (Cleveland) |
| <i>Acta Endocrinologica</i> (Copenhagen) | <i>Anesthesie Analgesie, Reanimation</i> (Paris) |
| <i>Acta Genetica et Statistica Medica</i> (Basel) | <i>Anesthesiology</i> (Philadelphia) |
| <i>Acta Haematologica</i> (Basel) | <i>Angiologica</i> (Basel) |
| <i>Acta Hepato-Splenologica</i> (Stuttgart) | <i>Angiology</i> (New York) |
| <i>Acta Microbiologica Polonica</i> (Warsaw) | <i>Animal Behaviour</i> (London) |
| <i>Acta Morphologica Academiae Scientiarum</i> | <i>Animal Hospital</i> (Chicago) |
| <i>Hungaricae</i> (Budapest) | <i>Annales de Biologie Clinique</i> (Paris) |
| <i>Acta Neurologica Scandinavica</i> (Copenhagen) | <i>Annales de Genetique</i> (Paris) |
| <i>Acta Ophthalmologica</i> (Copenhagen) | <i>Annales Medicinæ Experimentalis et Biologiae</i> |
| <i>Acta Paediatrica Academiae Scientiarum</i> | <i>Fenniae</i> (Helsinki) |
| <i>Hungaricae</i> (Budapest) | <i>Annales Pharmaceutiques Francaises</i> (Paris) |
| <i>Acta Paediatrica Scandinavica</i> (Stockholm) | <i>Annals de l'Institut Pasteur</i> (Paris) |
| <i>Acta Pathologica et Microbiologica</i> | <i>Annals of Allergy</i> (St. Paul) |
| <i>Scandinavica</i> (Copenhagen) | <i>Annals of Applied Biology</i> (London) |
| <i>Acta Physiologica Academiae Scientiarum</i> | <i>Annals of Internal Medicine</i> (Philadelphia) |
| <i>Hungaricae</i> (Budapest) | <i>Annals of Otolaryngology and Laryngology</i> |
| <i>Acta Physiologica et Pharmacologica</i> | (St. Louis) |
| <i>Neerlandica</i> (Amsterdam) | <i>Annals of Surgery</i> (Philadelphia) |
| <i>Acta Physiologica Latino-Americana</i> | <i>Annals of the New York Academy of Sciences</i> |
| (Buenos Aires) | (New York) |
| <i>Acta Physiologica Scandinavica</i> (Stockholm) | <i>Annals of the Rheumatic Diseases</i> (London) |
| <i>Acta Veterinaria Academiae Scientiarum</i> | <i>Antibiotiki</i> (Moscow) |
| <i>Hungaricae</i> (Budapest) | <i>Antonie Van Leeuwenhoek Journal of Micro-</i> |
| <i>Acta Virologica</i> (Prague) | <i>biology and Serology</i> (Amsterdam) |
| <i>Acta Zoologica Academiae Scientiarum</i> | <i>Applied Microbiology</i> (Baltimore) |
| <i>Hungaricae</i> (Budapest) | <i>Archiv fuer die Gesamte Virusforschung</i> |
| <i>Activitas Nervosa Superior</i> (Prague) | (Vienna) |
| <i>Aerospace Medicine</i> (St. Paul) | <i>Archiv fuer Hygiene und Bakteriologie</i> (Munich) |
| <i>Agressologie</i> (Paris) | <i>Archiv fuer Mikrobiologie</i> (Berlin) |
| <i>American Heart Journal</i> (St. Louis) | <i>Archives de Biologie</i> (Liege) |
| <i>American Industrial Hygiene Association</i> | <i>Archives des Sciences Physiologiques</i> (Paris) |
| <i>Journal</i> (Detroit) | <i>Archives Francaise de Pediatrie</i> (Paris) |
| <i>American Journal of Anatomy</i> (Philadelphia) | <i>Archives Italiennes de Biologie</i> (Pisa) |
| <i>American Journal of Cardiology</i> (New York) | <i>Archives Internationales de Pharmacodynamie et</i> |
| <i>American Journal of Clinical Pathology</i> | <i>de Therapie</i> (Gand) |
| (Baltimore) | <i>Archives Internationales de Physiologie et de</i> |
| <i>American Journal of Digestive Diseases</i> | <i>Biochimie</i> (Liege) |
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| <i>American Journal of Epidemiology</i> (Baltimore) | (New York) |
| <i>American Journal of Gastroenterology</i> | <i>Archives of Dermatology</i> (Chicago) |
| (New York) | <i>Archives of Environmental Health</i> (Chicago) |
| <i>American Journal of Medicine</i> (New York) | <i>Archives of Internal Medicine</i> (Chicago) |
| <i>American Journal of Ophthalmology</i> (Chicago) | <i>Archives of Neurology</i> (Chicago) |
| <i>American Journal of Pathology</i> (New York) | <i>Archives of Ophthalmology</i> (Chicago) |
| <i>American Journal of Physical Medicine</i> | <i>Archives of Otolaryngology</i> (Chicago) |
| (Baltimore) | <i>Archives of Pathology</i> (Chicago) |
| <i>American Journal of Physiology</i> (Washington) | <i>Archives of Surgery</i> (Chicago) |
| <i>American Journal of Psychology</i> (Austin) | <i>Arthritis and Rheumatism</i> (New York) |
| <i>American Journal of Public Health and the</i> | <i>Australian Journal of Biological Sciences</i> |
| <i>Nation's Health</i> (New York) | (Melbourne) |
| <i>American Journal of Roentgenology, Radium</i> | <i>Australian Journal of Experimental Biology and</i> |
| <i>Therapy and Nuclear Medicine</i> | <i>Medical Science</i> (Adelaide) |
| (Springfield, Illinois) | <i>Australian Journal of Psychology</i> (Melbourne) |
| <i>American Journal of Surgery</i> (New York) | <i>Avian Diseases</i> (Amherst) |
| <i>American Journal of the Medical Sciences</i> | <i>Bacteriological Reviews</i> (Baltimore) |
| (Philadelphia) | <i>Behavioral Science</i> (Ann Arbor) |
| <i>American Journal of Tropical Medicine and</i> | <i>Behaviour</i> (Leiden) |
| <i>Hygiene</i> (Baltimore) | <i>Biken Journal; Journal of the Research</i> |
| <i>American Journal of Veterinary Research</i> | <i>Institute for Microbial Diseases</i> (Osaka) |
| (Chicago) | |

JOURNALS REVIEWED

Journal

Biochemical and Biophysical Research Communications (New York)
 Biochemical Journal (London)
 Biochemical Pharmacology (New York)
 Biochemische Zeitschrift (Berlin)
 Biochemistry (Washington)
 Biochimica et Biophysica Acta (Amsterdam)
 Biofizika (Moscow)
 Biokhimiya (Moscow)
 Biological Bulletin (Lancaster, Pennsylvania)
 Biological Reviews of the Cambridge Philosophical Society (London)
 Biophysical Journal (New York)
 Biophysik (Berlin)
 Biotechnology and Bioengineering (New York)
 Bulletin Eksperimentalnoi Biologii i Meditsiny (Moscow)
 Blood; The Journal of Hematology (New York)
 Blut (Munich)
 Bollettino della Societa Italiana di Biologia Sperimentale (Naples)
 Brain; Journal of Neurology (London)
 British Heart Journal (London)
 British Journal of Anaesthesia (Altrincham)
 British Journal of Cancer (London)
 British Journal of Dermatology (London)
 British Journal of Experimental Pathology (London)
 British Journal of Haematology (Oxford)
 British Journal of Industrial Medicine (London)
 British Journal of Nutrition (London)
 British Journal of Ophthalmology (London)
 British Journal of Pharmacology and Chemotherapy (London)
 British Journal of Radiology (London)
 British Journal of Surgery (Bristol)
 British Medical Bulletin (London)
 British Medical Journal (London)
 British Myological Society Transactions (Cambridge)
 British Veterinary Journal (London)
 Bulletin of the Wildlife Disease Association (Chicago)
 Canadian Entomologist (Ottawa)
 Canadian Journal of Biochemistry (Ottawa)
 Canadian Journal of Comparative Medicine and Veterinary Science (Garden Valley, Ontario)
 Canadian Journal of Genetics and Cytology (Ottawa)
 Canadian Journal of Microbiology (Ottawa)
 Canadian Journal of Physiology and Pharmacology (Ottawa)
 Canadian Journal of Zoology (Ottawa)
 Cancer (Philadelphia)
 Cancer Research (Chicago)
 Cardiology (Basel)
 Chemical and Pharmaceutical Bulletin (Tokyo)
 Chemotherapy (Basel)
 Circulation; Journal of the American Heart Association (New York)
 Circulation Research (New York)
 Clinica Chimica Acta (Amsterdam)
 Clinical and Experimental Immunology (Oxford)
 Clinical Chemistry (New York)
 Comparative Biochemistry and Physiology (New York)

Journal

Comptes Rendus des Seances de la Societe de Biologie et ses Filiales (Paris)
 Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences (Paris)
 Cornell Veterinarian (Ithaca)
 Cryobiology (Baltimore)
 Current Science (Bangalore)
 Current Therapeutic Research (New York)
 Dermatologica (Basel)
 Developmental Biology (New York)
 Diseases of the Chest (Chicago)
 Diseases of the Colon and Rectum (Philadelphia)
 Diseases of the Nervous System (Galveston)
 Doklady Akademii Nauk SSSR (Moscow)
 Ecological Monographs (Durham)
 Ecology (Durham)
 Electroencephalography and Clinical Neurophysiology (Montreal)
 Endocrinologia Japonica (Tokyo)
 Endocrinology (Philadelphia)
 European Journal of Cancer (Oxford)
 Experientia (Basel)
 Experimental and Molecular Pathology (New York)
 Experimental Brain Research (New York)
 Experimental Eye Research (London)
 Experimental Medicine and Surgery (New York)
 Experimental Neurology (New York)
 Experimental Parasitology (New York)
 Farmakologiya i Toksikologiya (Moscow)
 Federation Proceedings (Baltimore)
 Fertility and Sterility (New York)
 Fiziologicheskii Zhurnal SSSR imeni I. M. Sechenova (Moscow)
 Folia Biologica (Prague)
 Folia Microbiologica (Prague)
 Folia Primatologica (Basel)
 Gann; Japanese Journal of Cancer Research (Tokyo)
 Gastroenterologia (Basel)
 Gastroenterology (Baltimore)
 General and Comparative Endocrinology (New York)
 Genetica (The Hague)
 Genetical Research (London)
 Genetics (Austin)
 Geriatrics (Minneapolis)
 Gerontologia (Basel)
 Gnotobiotics Newsletter (Wilmington, Massachusetts)
 Growth (Philadelphia)
 Helvetica Chirurgica Acta (Basel)
 Helvetica Paediatrica Acta (Basel)
 Heredity (London)
 IEEE Transactions on Bio-Medical Engineering (New York)
 Immunology (Oxford)
 Indian Journal of Biochemistry (New Delhi)
 Indian Journal of Experimental Biology (New Delhi)
 Indian Journal of Medical Research (Calcutta)
 Industrial Medicine and Surgery (Sheboygan)
 International Archives of Allergy and Applied Immunology (Basel)
 International Journal of Cancer (Copenhagen)
 International Journal of Fertility (Springfield, Massachusetts)

Journal

International Journal of Neuropsychiatry
 (Chicago)
International Journal of Radiation Biology
and Related Studies in Physics,
Chemistry and Medicine (London)
Internationale Zeitschrift fuer Angewandte
Physiologie Einschlüsslich Arbeits-
physiologie (Berlin)
Investigative Ophthalmology (St. Louis)
Israel Journal of Medical Sciences (Jerusalem)
Izvestiya Akademii Nauk SSSR, Seriya
Biologicheskaya (Moscow)
Japanese Circulation Journal (Kyoto)
Japanese Heart Journal (Tokyo)
Japanese Journal of Experimental Medicine
 (Tokyo)
Japanese Journal of Genetics (Misima)
Japanese Journal of Pharmacology (Kyoto)
Japanese Journal of Physiology (Kyoto)
Japanese Journal of Veterinary Science (Tokyo)
Journal de Microscopie (Paris)
Journal de Physiologie (Paris)
Journal of Allergy (St. Louis)
Journal of Anatomy (London)
Journal of Animal Science (Albany)
Journal of Antibiotics; Series A (Tokyo)
Journal of Applied Bacteriology (Reading,
 England)
Journal of Applied Physiology (Washington)
Journal of Atherosclerosis Research
 (Amsterdam)
Journal of Bacteriology (Baltimore)
Journal of Biochemistry (Tokyo)
Journal of Bone and Joint Surgery (Boston)
Journal of Bone and Joint Surgery (London)
Journal of Cardiovascular Surgery (Torino)
Journal of Cellular Physiology (Philadelphia)
Journal of Chronic Diseases (St. Louis)
Journal of Clinical Investigation (Boston)
Journal of Clinical Pathology (London)
Journal of Comparative and Physiological
Psychology (Washington)
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Journal of Comparative Pathology (Liverpool)
Journal of Economic Entomology (College Park,
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Journal of Embryology and Experimental
Morphology (London)
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Journal of Experimental Biology (London)
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Journal of Experimental Zoology (Philadelphia)
Journal of General Microbiology (London)
Journal of General Physiology (Baltimore)
Journal of Gerontology (St. Louis)
Journal of Heredity (Washington)
Journal of Histochemistry and Cytochemistry
 (Baltimore)
Journal of Hygiene (Cambridge)
Journal of Hygiene, Epidemiology, Microbiology
and Immunology (Prague)
Journal of Immunology (Baltimore)
Journal of Infectious Diseases (Chicago)
Journal of Invertebrate Pathology (New York)
Journal of Investigative Dermatology
 (Baltimore)
Journal of Laboratory and Clinical Medicine
 (St. Louis)
Journal of Lipid Research (New York)
Journal of Mammalogy (Lawrence, Kansas)

Journal

Journal of Morphology (Philadelphia)
Journal of Nervous and Mental Disease
 (Baltimore)
Journal of Neurology, Neurosurgery and
Psychiatry (London)
Journal of Neuropathology and Experimental
Neurology (Baltimore)
Journal of Neurophysiology (Springfield,
 Illinois)
Journal of Neurosurgery (Chicago)
Journal of New Drugs (New York)
Journal of Nuclear Medicine (Chicago)
Journal of Nutrition (Philadelphia)
Journal of Occupational Medicine (New York)
Journal of Parasitology (Colorado Springs)
Journal of Pathology and Bacteriology (London)
Journal of Pediatrics (St. Louis)
Journal of Periodontology (Indianapolis)
Journal of Pharmaceutical Sciences
 (Washington)
Journal of Pharmacology and Experimental
Therapeutics (Baltimore)
Journal of Pharmacy and Pharmacology (London)
Journal of Physiology (London)
Journal of Reproduction and Fertility (London)
Journal of Small Animal Practice (London)
Journal of Surgical Research (Philadelphia)
Journal of the American Medical Association
 (Chicago)
Journal of the American Veterinary Medical
Association (Chicago)
Journal of the Experimental Analysis of
Behavior (Bloomington, Indiana)
Journal of the Institute of Animal Technicians
 (Welwyn, England)
Journal of the National Cancer Institute
 (Washington)
Journal of the Royal Microscopical Society
 (London)
Journal of Thoracic and Cardiovascular Surgery
 (St. Louis)
Journal of Trauma (Baltimore)
Journal of Ultrastructure Research (New York)
Journal of Urology (Baltimore)
Journal of Zoology (London)
Koninklijke Nederlandse Akademie van
Wetenschappen, Proceedings, Series C
 (Amsterdam)
Laboratory Animal Care (Baltimore)
Laboratory Animal Digest (St. Louis)
Laboratory Animals Information Service
Bulletin (Bombay)
Laboratory Investigation (New York)
Laboratory Practice (London)
Laboratory Primate Newsletter (Providence)
Lancet (London)
Life Sciences (Oxford)
Medical and Biological Engineering (London)
Medical Research Engineering (New York)
Medicina et Pharmacologia Experimentalis
 (Basel)
Medicina Thoracalis (Basel)
Metabolism: Clinical and Experimental
 (New York)
Microbiologia Espanola (Madrid)
Mikrobiologiya (Moscow)
Mutation Research (Amsterdam)
Mycologia (New York)
Mycopathologia et Mycologia Applicata
 (The Hague)
Nature (London)

Journal

Naturwissenschaften (Berlin)
 Neoplasma (Bratislava)
 Neuroendocrinology (Basel)
 Neurology (Minneapolis)
 New England Journal of Medicine (Boston)
 Nouvelle Revue Française d'Hématologie (Paris)
 Oikos (Copenhagen)
 Oncologia (Basel)
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 Oral Surgery, Oral Medicine and Oral
 Pathology (St. Louis)
 Parasitology (London)
 Pathologia et Microbiologia (Basel)
 Pathologia Veterinaria (Basel)
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 Pediatrics (Springfield, Illinois)
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 des Menschen und der Tiere (Berlin)
 Physics in Medicine and Biology (London)
 Physiologia Bohemoslovenica (Prague)
 Physiological Reviews (Washington)
 Physiological Zoology (Chicago)
 Plastic and Reconstructive Surgery
 (Baltimore)
 Postepy Biochemii (Warsaw)
 Poultry Science (College Station, Texas)
 Proceedings of the Helminthological Society
 of Washington (Washington)
 Proceedings of the Indian Academy of Sciences,
 Section B (Bangalore City)
 Proceedings of the Japan Academy (Tokyo)
 Proceedings of the National Academy of Science
 of the United States of America
 (Washington)
 Proceedings of the Nutrition Society (London)
 Proceedings of the Royal Society Series B
 (London)
 Proceedings of the Society for Experimental
 Biology and Medicine (New York)
 Psychological Record (Bloomington, Indiana)
 Psychopharmacologia (Berlin)
 Psychosomatic Medicine (New York)
 Quail Quarterly (Auburn, Alabama)
 Quarterly Journal of Experimental Physiology
 and Cognate Medical Sciences (Edinburgh)
 Quarterly Journal of Experimental Psychology
 (Cambridge)
 Radiation Research (New York)
 Radiology (Syracuse)
 Research in Veterinary Science (Oxford)
 Respiration Physiology (Amsterdam)
 Revista Espanola de Fisiologia (Barcelona)
 Revue Canadienne de Biologie (Montreal)
 Revue d'Immunologie et de Therapie
 Antimicrobienne (Paris)
 Revue Française d'Etudes Cliniques et
 Biologiques (Paris)
 Revue Roumaine de Biochimie (Bucharest)
 Rivista di Medicina Aeronautica e Spaziale
 (Rome)

Journal

Scandinavian Journal of Clinical and
 Laboratory Investigation (Oslo)
 Scandinavian Journal of Haematology
 (Copenhagen)
 Scandinavian Journal of Psychology
 (Stockholm)
 Science (Washington)
 Scientia Sinica (Peking)
 Seikagaku (Tokyo)
 Surgery (St. Louis)
 Texas Reports on Biology and Medicine
 (Galveston)
 Thorax (London)
 Thrombosis et Diathesis Haemorrhagica
 (Stuttgart)
 Tohoku Journal of Experimental Medicine
 (Tokyo)
 Toxicology and Applied Pharmacology (New York)
 Transfusion (Philadelphia)
 Transplantation (Baltimore)
 Tumori (Milan)
 Veterinary Bulletin (The Commonwealth Bureau
 of Animal Health) (Farnham Royal,
 England)
 Veterinary Medicine-Small Animal Clinician
 (Kansas City, Missouri)
 Veterinary Record (London)
 Virchows Archiv fuer Pathologische Anatomie
 und Physiologie und fuer Klinische
 Medizin (Berlin)
 Virology (New York)
 Voprosy Meditsinskoi Khimii (Moscow)
 Voprosy Virusologii (Moscow)
 Vox Sanguinis (Basel)
 Yakugaku Zasshi (Journal of the Pharmaceutical
 Society of Japan) (Tokyo)
 Yonago Acta Medica (Tattori-ken, Japan)
 Zeitschrift fuer Biologie (Berlin)
 Zeitschrift fuer Immunitätsforschung,
 Allergie und Klinische Immunologie
 (Stuttgart)
 Zeitschrift fuer Klinische Chemie (Berlin)
 Zeitschrift fuer Krebsforschung (Berlin)
 Zeitschrift fuer Naturforschung (Tuebingen)
 Zeitschrift fuer Vergleichende Physiologie
 (Berlin)
 Zeitschrift fuer Versuchstierkunde (Jena)
 Zeitschrift fuer Zellforschung und
 Mikroskopische Anatomie (Berlin)
 Zentralblatt fuer Veterinaermedizin Reihe A
 (Berlin)
 Zentralblatt fuer Veterinaermedizin Reihe B
 (Berlin)
 Zhurnal Mikrobiologii Epidemiologii
 Immunobiologii (Moscow)
 Zhurnal Obshchei Biologii (Moscow)
 Zhurnal Vysshei Nemoi Deyatel'nosti imeni
 I.P. Pavlova (Moscow)

CARE, MANAGEMENT, FACILITIES, EQUIPMENT

124. Bantin, G. C. (British Drug Houses Ltd., Godalming, Surrey, England). 1966. *Establishment of a squirrel monkey colony*. J. Inst. Animal Tech. 17: 66-73.

The author describes his experiences in establishing and maintaining a colony of squirrel monkeys. The physical requirements of the species are related. Results of dietary studies, handling and behavioral precautions, and several physiologic and morphologic characteristics including estrous cycle, gestation period, rectal temperature, pulse and respiratory rates, and dentition are described. The parasitic and infectious diseases of this species are discussed with special emphasis on those that become apparent during initial quarantine of new inmates. The author recommends the animal for laboratory investigations if the necessary environmental conditions can be provided. - D. L. Ford.

125. Sharpe, L. G. (Stanford Research Institute, Menlo Park, California 94025) and L. S. Otis. 1966. *Notes on the maintenance of squirrel monkeys out-of-doors*. Lab. Primate Newsletter 5: 5-7.

The authors report their experiences in maintaining squirrel monkeys in small outside compounds under conditions of wide temperature and humidity variations. They conclude that the squirrel monkey, if received in good health, is not as delicate a creature to maintain as some may believe. Squirrel monkeys in groups of ten to 30 can easily tolerate temperatures of 30-40 F (and possibly lower) along with a wide range of relative humidities. It appears that group living in an adequate amount of space enhances the survival value of these animals under a wide range of conditions. Since squirrel monkeys are relatively easy to catch and handle in the outdoor compound, this mode of housing will most likely prove to be one of the best and lowest-cost methods for maintaining large numbers of animals for laboratory use or for naturalistic observations in geographic areas where severe cold and snow are not a problem. - R. J. Flynn.

126. Hampton, J. K., Jr. (Tulane University School of Medicine, New Orleans, Louisiana 70112), Suzanne H. Hampton, and Barbara T. Landwehr. 1966. *Observations on a successful breeding colony of the marmoset Oedipomidas oedipus*. Folia Primatol. 4: 265-287.

The authors' experience with a colony of marmosets, primarily *Oedipomidas oedipus*, is given, and salient features of the husbandry of marmosets are discussed with extensive references to relevant literature. The uniquely high vitamin D requirement of the marmoset in the absence of ultraviolet light is pointed out. Marmosets require about 500 I. U. of vitamin D₃/animal/day and appear able to tolerate much more without signs of toxicity. Data are presented on 38 recorded pregnancies among 23 females during approximately 19 months. From interbirth intervals the authors conclude the gestation period is probably about 140 days and that colony production may be based on an estimate of a birth from most females almost every 200 days. Seventeen sets of twins are reported from which the male:female:heterosexual proportions were 4:6:7. This adds weight to the belief that biocular twinning is the rule for these animals. General social and sexual behavior

is given and many observations lead the authors to conclude that *O. oedipus* shows a monogamous-like social structure based largely on fierce competition between females. - *Authors' summary modified.*

127. Miles, D. A. F. (National Institute for Research in Dairying, Shinfield, Reading, Berks, England). 1966. *The Japanese quail (Coturnix coturnix japonica): breeding and management in the laboratory.* J. Inst. Animal Tech. 17: 74-79.

Methods of incubating, sexing, feeding, rearing and housing the Japanese quail, both for chicks and adults, are described. The composition of an adequate diet is given, and a drinking fountain for newly hatched chicks, which eliminates drowning and wetting, is described. - *D. D. Banister.*

128. Gibbs, E. L. (University of Illinois, College of Medicine, Chicago, Illinois 60612), Trudy J. Gibbs, and P. C. Van Dyck. 1966. *Rana pipiens: health and disease.* Lab. Animal Care 16: 142-160.

Rana pipiens commonly suffers from bacterial, viral and parasitic infections. These infections are discussed in terms of interest to those using frogs as laboratory animals. Bacterial infections are considered the most serious and are dealt with in detail. Improvements on a previously published treatment for bacterial infections, employing tetracycline, are given along with observations related to the use of the treatment. Methods for frog care in the laboratory are suggested. - *Authors' summary.*

129. Softly, A. (Royal Perth Hospital, Perth, Western Australia, Australia) and E. G. Cockett. 1966. *Aspects of maintaining snakes as laboratory animals.* J. Inst. Animal Tech. 17: 49-60.

For two years, nine species of snakes, all indigenous to Australia and the majority highly venomous, were maintained by the authors. These reptiles were used in virological and immunological studies. The authors' experiences and some of the techniques they evolved are presented. - *R. J. Flynn.*

130. Chester, D. (Madurai Medical College, Madurai, India). 1966. *Maintenance of cleanliness in an animal house.* Lab. Animal Inform. Serv. Bull. 1966: 9-11.

The author stresses the importance of raising laboratory animals under hygienic conditions. General factors in room and building construction are discussed. The author suggests management routines for caging (including changing and cleaning of cages), feeding and watering, as well as pest control. Disease control and incineration of dead animals and infective material are important. Most important of all is the attitude of the staff. The author concludes that a clean animal house can be maintained with a minimum of effort if simple rules of hygiene and sanitation are established and the workers in the animal house conscientiously observe them. - *R. W. Camden.*

131. Cheatle, Esther L. (University of Illinois College of Medicine, Chicago, Illinois 60612) and R. W. Snyder. 1966. *An evaluation of some disinfectants*. Am. J. Clin. Pathol. 45: 412-414.

The efficacy of certain disinfectants used for "cold sterilization" was studied by the authors. Six different disinfectants were studied in contact with three separate organisms for 3, 5, 10 or 15 minutes. In addition, these disinfectants were studied against mixed cultures of organisms. The authors conclude that no disinfectant can be relied upon to be effective against all organisms. They suggest four points as practical approaches to be taken in the use of "cold sterilization." These include proper washing of equipment, frequent changing of solutions, timed immersion, and awareness of bactericidal effectiveness. - R. W. Camden.

132. Brewer, J. H. (Becton, Dickinson and Company, Rutherford, New Jersey) and R. J. Arnsberger. 1966. *Biological-chemical indicator for ethylene oxide sterilization*. J. Pharm. Sci. 55: 57-59.

The use of a biological-chemical indicator for ethylene oxide sterilization is reported. The indicator system affords an immediate visible indication of gas penetration into the materials during the sterilization cycle and also serves as a biological (spore) control. Preparation of the indicator is discussed in some detail, including the organisms and chemicals employed and the basic chemical reactions. The usefulness of the indicator for determination of gas penetration is discussed in terms of diffusion of the gas and permeability of the materials, including latex and plastic films. - Authors' summary modified.

133. Schrier, A. M. (Brown University, Providence, Rhode Island 02912). 1966. *The Primate Behavior Laboratory of Brown University*. J. New Drugs 6: 124-127.

The Primate Behavior Laboratory was completed during 1964. Roughly a third of the laboratory is research space, another third animal colony rooms, and the rest is primarily corridors, offices, and shop workrooms. All internal partitions are *Lelite* block, a lightweight material similar to cinder block. Outside of the colony rooms, the concrete slab floor is covered with rubber tile. All rooms are air-conditioned, and there is also some humidity control, primarily in the direction of an increase to about 50% during the heating season. None of the air is recirculated. Except for the colony rooms, temperature and humidity are controlled by zones. To reduce the transmission of noise, there are baffles in the ventilating ducts between rooms, doors located at three places in the corridors, weather-stripping around the door of each, and, except for the colony rooms, Fiberglas acoustic tile on the ceilings. - R. J. Flynn.

134. Szlauer, K. (Huntingdon Research Centre, Huntingdon, England). 1966. *Non-spill food container for rats*. J. Inst. Animal Tech. 17: 47-48.

A rodent feeder, designed to minimize the scattering of nonpelleted diets, is described. The author has found that spillage associated with this device, when it is properly used (that is, its size is related to the animal's size, and it is not overfilled), is negligible. - D. D. Banister.

135. Mills, R. R. (Tulane University, New Orleans, Louisiana 70118). 1966.
A cockroach rearing cage designed for the collection of oothecae.
J. Econ. Entomol. 59: 490.

A method of producing large numbers of the American cockroach, *Periplaneta americana*, is described. The method involves the use of a large cage with the floor made from 3/8 inch wire mesh. The wide mesh allows the oothecae and feces to drop into drawers at the bottom of the cage. At desired intervals, papers placed in the bottom of the drawers are removed and the egg cases and feces brushed off into a screen box. The feces fall through the screen, and the egg cases can be transferred to an aquarium for rearing. - R. J. Flynn.

NUTRITION

GENERAL CONSIDERATIONS, WATER, FAT, PROTEIN

136. Fox, C. (MRC Laboratory Animals Centre, Carshalton, Surrey, England), L. Mundy, and G. Porter. 1966. *A comparison between two pelleted diets fed to young rabbits*. J. Inst. Animal Tech. 17: 61-65.

Two strains of rabbits, Sandy lop and F₁ cross (Sandy lop x New Zealand White), were used to compare two commercially produced rabbit diets, SGL and RGP for their ability to support normal weight gain in young rabbits over an 11-week period. It was shown that both diets support normal weight gain. An effect of strain difference is shown in that the Sandy lop rabbits constantly gained more weight on diet SGL than on RGP while the weight gain of the F₁ cross was practically equal for both diets. The approximate cost of producing rabbits under laboratory conditions is given. - *Authors' summary modified.*

137. Koehn, C. J. (Southwest Foundation for Research and Education, San Antonio, Texas 78206). 1966. *The feeding of baboons*, Papio cynocephalus and P. doguera. Lab. Animal Care 16: 178-184.

Several formulas were combined into a single item which was used as the sole ration for the colony of baboons at the Southwest Foundation for Research and Education. The ration is palatable and apparently nutritionally adequate. It is characterized by a high protein content, 40% of which is derived from animal sources, and a low carbohydrate content. It contains approximately 8.9% vegetable oils and only 0.45% fat derived from animal sources. Its ingredients are available in most feed stores except the mineral and vitamin fortification mixtures. Biscuit was the most convenient form of handling the food, and hog feeders were the most efficient dispensers. - *Author's summary modified.*

138. Beane, W. L. (Virginia Polytechnic Institute, Blacksburg, Virginia 24061) and J. R. Howes. 1966. *Review of quail nutrition: Part II. The nutritional requirements of coturnix quail*. Quail Quarterly 3: 43-50.

Little is known of the nutritive requirements of the coturnix quail. It is generally agreed that it requires a higher amount of protein in its diet than the domestic fowl. Improved growth and egg production are obtained when the protein level is increased from 18 to 23%. Higher levels are not significantly beneficial. Linoleic acid is considered essential, but most practical diets contain an ample amount of this nutrient. A higher mortality has been noted in quail fed 1150 calories per pound of ration compared with those fed 950 calories. Laying coturnix quail requires 4% calcium and 1.25% phosphorus. Young quail, 5-21 weeks of age, requires 2.5-3.0% calcium and 0.6-0.8% phosphorus. Few data are available concerning the vitamin requirements. The addition of terramycin to the diet of laying coturnix quail produces a significant increase in egg production but no difference in egg weight. Otherwise, little is known of the nutrient requirements of this species. - *R. J. Flynn.*

139. Jogelkar, G. V. (B. J. Medical College, Poona, India) and J. H. Balwani. 1966. *Observations with milk-powder deficient diet in albino rat and albino mice colony*. Lab. Animal Inform. Serv. Bull. 1966: 12-14.

Because milk powder for animal diets is either unavailable or very expensive in India, the authors set up an experiment to test a milk-powder deficient diet. The deficient diet and a milk-powder supplemented diet were fed to two groups of mice for four months. No significant differences were noted in weight gains or number of pregnancies. The mice and rats on the milk-powder deficient diet produced significantly fewer offspring. Those offspring that were produced had inferior fur and showed less activity than those from groups fed the milk-powder supplemented diet. - R. W. Camden.

140. Dudrick, S. J. (University of Pennsylvania, Philadelphia, Pennsylvania 19104), H. M. Vars, H. M. Rawnsley, and J. E. Rhoads. 1966. *Total intravenous feeding and growth in puppies* (abstract). Federation Proc. 25: 481.

Beagle pups were given their total nutritive requirements by a near-continuous intravenous infusion for 175, 72, and 30 days. Only tap water was available for oral consumption. Litter-mate controls were given, orally, a standard diet at the same caloric level. Body size and metabolic responses were comparable in the two groups. - R. J. Flynn.

141. Konishi, F. (Southern Illinois University, Carbondale, Illinois 62901). 1966. *Growth and enzymatic response to diet quality, chronic inactivity, and forced exercise* (abstract). Federation Proc. 25: 481.

The effects of diet quality, reduced feeding period, and chronic inactivity on the growth of rats and levels of glucose-6-phosphate dehydrogenase (G-6-PDH) and 6-phosphogluconate dehydrogenase (6-P-GDH) in the hepatic and epididymal fat tissues were investigated. Male Sprague-Dawley rats were fed and housed in regular individual cages or in cages reduced in size to 1/4 the original by means of an adjustable spacer. The rats were exercised on a motor-driven treadmill. The mean body weights of the chronically restricted rats were significantly lower irrespective of diet quality. Diet quality significantly influenced the growth of the rats as well as the activities of G-6-PDH and 6-P-GDH, but the restriction of the activity did not influence the levels of dehydrogenases. The forced exercise significantly decreased hepatic and adipose G-6-PDH but not the 6-P-GDH. The time of eating in relation to the exercise period also influenced the level of G-6-PDH in the liver but not in the adipose tissue. - Author's summary modified.

142. Chow, B. F. (Johns Hopkins University, Baltimore, Maryland 21205), A. M. Hsueh, C. J. Lee, and C. E. Agustin. 1966. *Nutritionally induced growth stunting* (abstract). Federation Proc. 25: 733.

Permanent growth stunting of rats results from maternal dietary restriction and competitive lactation. The former also results in abnormal nitrogen and carbohydrate metabolism. Experiments were designed to determine if competitive lactation causes similar metabolic derangement in addition to growth

stunting. Sixteen pregnant rats were divided into two groups. Both groups received Purina Chow throughout pregnancy and lactation. Six rats (group II) were fed precisely half the average daily intake of group I *ad libitum*. At delivery the group I litters were redistributed to form (a) two litters of three, (b) six litters of eight, (c) two litters of 18. Group II litters were reduced to eight animals each. After weaning progeny were fed *ad libitum*. Growth rate, feed efficiency, nitrogen excretion and glucose tolerance of the progeny were determined. At six months, the mean body weights in each of the male subgroups were: I(a) 471 g, I(b) 400 g, I(c) 381 g, II 319 g. Nitrogen wastage, low feed efficiency and impaired glucose tolerance were observed in group II only. This suggests that not all growth stunted animals suffer from metabolic derangements. - *Authors' summary*.

143. Peters, J. M. (Queen's University, Kingston, Ontario, Canada) and C. J. Krijnen. 1966. *Organ weights and water contents of rats fed purified diets*. Growth 30: 99-107.

Organ weights and water contents of young adult female rats fed two types of purified diets for 14 to 28 days were compared with controls fed laboratory diet. Recovery was recorded in rats fed a purified diet for 28 days and then given laboratory diet. Compared with rats on regular diet, animals fed purified diets develop lower weights and water in the gastrointestinal tissues and loss of weight of luminal contents. The changes occurred within 14 days in small bowel, cecum and colon, but developed more slowly in the stomach. The weight of heart, skin and residual carcass was moderately increased. These findings may provide a possible explanation of the altered reaction toward challenging doses of drugs in animals on such purified diets. - *Authors' summary modified*.

144. Kayser, Jacqueline (Conservatoire national des Arts et Métiers, Paris 3, France), J. Neumann, and J. Lavollay. 1966. *Sur la longévité du rat Wistar nourri ad libitum avec un régime semi-synthétique (On the longevity of the Wistar rat fed a semi-synthetic diet ad libitum)*. Comp. Rend. 262: 2063-2065.

Wistar rats, 104 males and 50 females, were fed a semisynthetic diet and were observed until they died a natural death. The average life span for the males was 855 days and for the females, 935 days. The maximum age obtained by a male was 1238 days, and for a female, 1249 days. Eight percent of the males and 18% of the females lived more than 1100 days. The maximum weight attained by the males was 458 g and by the females, 300 g. Reproduction in both sexes was satisfactory, and signs of senescence did not appear until the rats were about 750-800 days old. - *R. J. Flynn*.

145. Kilmore, M. A. (U. S. Army Natick Laboratories, Natick, Massachusetts 01760), L. M. Breslouf, L. A. Santoro, and W. K. Calhoun. 1966. *Water requirements for running in rats* (abstract). Federation Proc. 25: 481.

Since rats are sometimes used to study the effect of dietary treatment on muscular exhaustion, knowledge of the water requirement for treadmill running is needed. Eight groups of young adult, male, Long Evans rats were deprived of water for 0, 4, 8, 16, 32, 48, 64, and 72 hr prior to running on

a treadmill. The food, a semipurified diet containing 30% fat and 22% casein, was removed from all rats 14 hours before running. There was no detriment in exhaustive running times until the rats had been deprived of water for at least 32 hours. However, even at the extreme periods of water deprivation, the exhaustive running times were only minimally below those of the control rats. When the rats were deprived of water for two days or longer, there was a considerable reduction in body weight. This reduction of body weight was beneficial in enabling the animals to run after water deprivation. Work output was much less than with the control animals. Exhaustive rectal temperature increased when the animals were deprived of water. These results show that the rat is less susceptible to water deprivation during running than is the dog. - *Authors' summary modified.*

146. Wissler, R. W. (University of Chicago, Chicago, Illinois 60637), G. S. Getz, D. Vesselinovitch, L. E. Frazier, and R. H. Hughes. 1966. *Acute severe experimental atherosclerosis in rhesus monkeys* (abstract). Federation Proc. 25: 597.

Moderate to severe atherosclerosis of the aorta and coronary arteries was produced in 18 of 24 Rhesus monkeys in nine months by feeding a 25% lipid diet consisting of a 1:1 mixture of coconut oil and butter added to a commercial low-fat primate ration along with 2% cholesterol. This diet produced a prompt elevation of circulating serum lipids characterized by serum cholesterol values greater than 1 g % and total lipid concentrations of 1600 g % or more. The more severe lesions extended deep into the media, involved most of the aortic surface, were focally ulcerated and often showed extensive superficial fibrous tissue proliferation and focal calcification. In all lesions lipid deposited in presumably preexisting medial cells was apparent. Although there was some tendency for the lesions to be less severe when 0.4% Na meprobamate was added to the ration and more severe when 0.02% ephedrine sulfate was added, these differences were much less striking than those previously reported under less atherogenic dietary conditions in the Cebus monkey. - *Authors' summary.*

147. Clarke, G. B. (Michael Reese Hospital, Chicago, Illinois 60616), Savitri Jain, Ruth Pick, and L. N. Katz. 1966. *Influence of various dietary fats on hypercholesterolemia and atherogenesis in cockerels*. Circulation Res. 18: 213-218.

When cockerels were given a cholesterol supplemented, fat-free semi-synthetic diet as the basic ration, all oils and solid fats were atherogenic and caused elevated serum cholesterol levels. The degree of hypercholesterolemia and atherogenesis was related to the fatty acid composition of the fat fed. - *Authors' summary modified.*

148. Svoboda, D. (University of Kansas Medical Center, Kansas City, Kansas 66103), H. J. Grady, and J. Higginson. 1966. *The effects of chronic protein deficiency in rats: II. Biochemical and ultrastructural changes*. Lab. Invest. 15: 731-749.

The results are reported of an investigation in rats to determine whether the severe hepatic lesions seen by electron microscopy in protein

deficiency are common to several organs and to determine the possible significance of these lesions in relation to kwashiorkor. No lesions common to all organs were seen at the periods examined. The relationship of these lesions to human kwashiorkor and reported biochemical changes is discussed. - R. J. Flynn.

149. Povar, M. L. (Brown University, Providence, Rhode Island 02912). 1966. *Protein in the diet of nonhuman primates*. Lab. Primate Newsletter 5: 8-9.

The author emphasizes the lack of knowledge of specific nutritional requirements of nonhuman primates. A report summarizing the current thought on protein requirements and quality are discussed. The expense of quality-controlling diets is also mentioned. The author concludes that supplementing commercial diets with natural foods probably contributes to the variable results obtained in different laboratories with similar animals. - R. W. Camden.

150. Czajka, D. M. (Massachusetts Institute of Technology, Cambridge, Massachusetts 02139), S. A. Miller, and A. M. Browning. 1966. *The effect of dietary protein level on body composition in artificially reared infant rats* (abstract). Federation Proc. 25: 605.

The effect of reducing dietary protein, from 9.6% to 4.8%, on the body composition of infant rats has been extended to study the effects of lower protein levels (down to 0.6%). The lower protein concentrations were obtained by diluting rat's milk with a diluent mixture designed to simulate rat's milk, but containing no protein. All of the pups were pair-fed to the group fed 9.6% protein (whole rat milk) for a period of five days (from day one). Although the total weight-gain decreased with decreasing protein level in the diet, all groups gained weight. The pups receiving 9.6% protein gained 9.5 g and the groups receiving 4.8, 2.4, 1.2, and 0.6% protein gained 6.1, 3.3, 2.2 and 1.1 g respectively. Carcass protein decreased from 13.1% for the group receiving the highest dietary protein level to 11.7% for the group receiving the lowest. Liver protein also decreased with decreasing dietary levels of protein. The reverse response was observed in moisture content. The relative carcass nitrogen retentions ranged from 0.6 for the pups fed 9.6% protein to 1.0 for the pups fed 0.6% protein. - Authors' summary modified.

151. Lee, N. H. (Jefferson Medical College, Philadelphia, Pennsylvania 19107), M. Hospador, and R. W. Manthei. 1966. *Hexobarbital metabolism in mice on a low protein diet* (abstract). Federation Proc. 25: 531.

Mice maintained on isocaloric diets which differ only in protein and carbohydrate content exhibit different hexobarbital sleeping times. Mice on a low protein diet slept longer than those on a normal protein diet at all times over a two-month feeding period. - Authors' summary modified.

152. Burlington, R. F. (Fitzsimons General Hospital, Denver, Colorado 80240) and D. D. Schnakenberg. 1966. *Effect of diet and high altitude on growth and caloric intake in rats* (abstract). Federation Proc. 25: 481.

Male Holtzman rats (initial weight - 160 ± 5 g) were fed *ad libitum* with a diet high in carbohydrate, fat, or protein and exposed to an altitude of 14,110 ft for 21 days after a ten-day dietary adjustment period. Control animals received the same diets and remained at 5,000 ft. Growth was depressed in all groups at high altitude, most markedly in animals consuming the high protein diet. At the high altitude, growth patterns were similar in rats maintained on fat or carbohydrate diets, whereas, food consumption was decreased significantly in carbohydrate and protein-fed animals but not in fat-fed animals. The gram weight gain/100 kcal consumed for control and altitude groups respectively was as follows: carbohydrate 7.5, 5.9*; protein 8.8, 4.6*; fat 6.1, 5.1** (*P = <.001; P** = <.01). A high protein diet is apparently the least desirable for the support of growth in rats at high altitude. - *Authors' summary.*

153. Reid, J. V. O. (University of Natal, Durban, South Africa) and Patricia Berjak. 1966. *Dietary production of myocardial fibrosis in the rat.* Am. Heart J. 71: 240-250.

The dietary production of a cardiomyopathy in rats is described. The tryptophan contents of the diet and plasma were low. Late supplementation with tryptophan, nicotinamide, or pyridoxine failed to prevent fibrosis, and possible reasons for the failure are discussed. Plasma levels of tryptophan correlated inversely with the severity of the cardiomyopathy. The severity of cardiac findings in females was associated with pregnancy rate. A possible relationship to African cardiomyopathy and a significance to cardiac disorders which are associated with disturbances of tryptophan metabolism are suggested. - *Authors' summary.*

VITAMINS, MINERALS, TRACE FACTORS

154. Mizutani, M. (Biological Research Laboratories, Takeda Chemical Industries, Ltd., Osaka, Japan), T. Ihara, and K. Kaziwara. 1966. *Effect of hypervitaminosis A on the fetus of several species of rodents, with special reference to malformation of the extremities.* Japan. J. Genetics 41: 141-153.

This paper deals with a) a gross comparison of the embryonic development of CF 1 mice, Sprague Dawley rats and albino rabbits; b) the relationship between the stage of pregnancy at which experimental hypervitaminosis A is induced and the incidence of fetal deaths, embryonic losses, and limb and digital malformations; and c) the relationship between various degrees of hypervitaminosis A and malformation of the extremities in the three species. Susceptibility, expressed by fetal deaths and including embryonic losses, seems to be highest in the rabbit, next in the mouse and lowest in the rat, while susceptibility of limb buds and hand or foot plates to the teratogenic action of hypervitaminosis A seems to be highest in the mouse, next in the rat and lowest in the rabbit. The dose-response relationship in the

production of limb and digital malformations and the minimal teratogenic dose were shown to vary greatly according to the species involved. Embryonic susceptibility estimated from the dose-response curve and minimal teratogenic dose were highest in mice, next in rats and lowest in rabbits. - C. M. Poole.

155. Jones, J. H. (University of Pennsylvania, Philadelphia, Pennsylvania 19104), Elizabeth B. Bullard, and Aida Rodriguez. 1966. *Vitamin A in the nutrition of goldfish* (*Carassius auratus*) (abstract). Federation Proc. 25: 546.

About 100 goldfish (average weight 5.7 g) were divided into two equal groups. One group was given a complete diet. The other group was given the same diet but with no vitamin A added. At intervals, sample fish were killed and their liver and eyes analyzed for vitamin A. The amounts were variable, but, in the deficient animals, gradually decreased, especially in the liver. After six months the first deficiency signs were observed. These consisted of hemorrhage into the chamber of the eye and in the buccal cavity, loss of scales and redness at the base of the fins and tail. Death occurred shortly after the appearance of the signs. After the first ten days of the experiment only three of the control fish on the complete diet died spontaneously, during the following 16 months. None showed any deficiency signs. - Authors' summary modified.

156. Briggs, G. M. (University of California, Berkeley, California 94721), Janice Enamoto, and J. T. Typpo. 1966. *The riboflavin requirement of young guinea pigs* (abstract). Federation Proc. 25: 246.

The dietary riboflavin requirement for optimal growth of guinea pigs of mixed sexes weaned at six to nine days of age was determined. Semisynthetic diets with 30% vitamin-free casein were used in this study. The levels of riboflavin (mg/kg diet) tested in 10 experiments were 0.0, 0.33, 0.67, 1.0, 1.33, 2.0, 3.0, 8.0, 10.0, 16.0, and 30.0. Liver, fecal, and urinary levels of riboflavin at different dietary concentrations of the vitamin were determined. Visible signs of riboflavin deficiency during the 28-day test period were observed only at the two lowest levels of supplementation. Growth and mortality data of the more than 250 animals involved in this study suggested that less than 1.0 mg/kg of diet and perhaps as little as 0.67 mg is sufficient to permit maximal growth and livability in weanling guinea pigs over a four-week period. However, urinary measurements indicated maximal tissue saturation occurred at diet levels of approximately 2.0 mg of riboflavin/kg of diet. Although these data indicate a riboflavin requirement of less than 1 mg/kg of diet, it is suggested that at least four times this amount be added to normal experimental diets. - Authors' summary.

157. Foy, H. (Wellcome Trust Research Laboratories, P. O. Box 30141, Nairobi, Kenya), Athena Kondi, and Veristine Mbaya. 1966. *Serum vitamin B₁₂ and folate levels in normal and riboflavin-deficient baboons* (*Papio anubis*). Brit. J. Haematol. 12: 239-245.

Baboons given, *ad libitum*, a balanced synthetic diet but lacking riboflavin showed an increase in their serum B₁₂ levels and a fall in their serum folate values when compared with animals on a "natural" diet. When ribo-

flavin was added to the synthetic diet there was a decrease in B_{12} and a rise in folate value. Profound changes in the albumin-globulin ratio occurred on the riboflavin-deficient diet which reverted to normal when riboflavin was given. The reasons for these changes are discussed. Riboflavin was considered to be more important than dietary proteins. Alterations in plasma volume as well as marrow activity seem to affect serum B_{12} and folate levels, particularly if B_{12} stores are diminished. The megaloblastosis that sometimes followed prednisone treatment was probably due to increased erythropoiesis and enhanced upsets in folate metabolism that were initiated by riboflavin deficiency. - *Authors' summary.*

158. Wizgird, J. P. (University of California School of Medicine, San Francisco, California 94122) and L. D. Greenberg. 1966. *Pyridoxine and essential fatty acid deficiencies in experimental arteriosclerosis in the rhesus monkey* (abstract). Federation Proc. 25: 597.

A comparison was made of arterial lesions in groups of monkeys subjected to individual and combined deficiencies of B_6 and essential fatty acids. A variety of arteries, including the coronaries, renals, aorta, and small arteries of various organs, were examined grossly and microscopically for the presence of arteriosclerotic lesions. Essential fatty acid-deficient and control animals showed minimal or no arterial lesions. Pyridoxine deficient animals showed moderate to marked arteriosclerosis. Animals deficient in both essential fatty acids and B_6 for only half as long also showed moderate to marked lesions. The results show essential fatty acid deficiency alone does not produce appreciable arteriosclerosis. - *Authors' summary modified.*

159. Cohen, Nina L. (University of California, Berkeley, California 94721), and G. M. Briggs. 1966. *Vitamin B_{12} metabolism in the golden hamster* (abstract). Federation Proc. 25: 430.

A B_{12} deficiency was developed in the hamster using a purified diet with soybean protein with the addition of thyroid powder, iodized casein or propylthiouracil. At the end of 13 weeks there was no difference in body-weight gains among the B_{12} -deficient or supplemented animals. Urinary excretion of methylmalonic acid was noted after five weeks and formiminoglutamic acid after 13 weeks on the B_{12} -deficient diet. Liver and blood glutathione levels as well as liver coenzyme A levels were raised by the lack of dietary vitamin B_{12} . There was no difference in the excretion of aminoimidazole carboxamide by the deficient or supplemented animals. Differences in red blood cell count, hematocrit, hemoglobin and differential cell counts were all within the normal range. The deficiency was reversed by feeding the deficient animals vitamin B_{12} . - *Authors' summary modified.*

160. Hunt, R. D. (Harvard Medical School, Boston, Massachusetts 02115), F. G. Garcia and D. M. Hegsted. 1966. *Vitamin D requirement of new world primates* (abstract). Federation Proc. 25: 545.

Progressive osteomalacia and osteodystrophia fibrosa developed in Cebus monkeys (*Cebus albifrons*) using a purified diet containing 0.8% Ca, 0.46% P, and 2,000 IU vitamin D_2 /kg. The disease was characterized by high serum alkaline phosphatase, gross skeletal distortion, multiple fractures, marked

osteoclastic activity with resorption of the cortex, fibrous replacement of the marrow and subperiosteal new bone production. Vitamin D_3 at the same level resulted in reversal of the disease process. Preliminary data suggests similar results in other species of New World primates (*Saimiri sciureus*, *Oedipomidas oedipus*, *Tamarinus nigricollis*). - Authors' summary modified.

161. Lehner, N. D. M. (Bowman Gray School of Medicine, Winston-Salem, North Carolina 27103), B. C. Bullock, T. B. Clarkson, and H. B. Lofland. 1966. *Biological activity of vitamins D_2 and D_3 fed to squirrel monkeys* (abstract). Federation Proc. 25: 533.

Rickets and osteomalacia have been observed in squirrel monkeys (*Saimiri sciureus*) fed usual laboratory diets containing vitamin D_2 . Groups of three juvenile squirrel monkeys were fed semisynthetic diets containing no vitamin D or vitamins D_2 or D_3 (1.25, 2.5, 5.0, and 10.0 IU/g of diet) to compare the relative biological activities for growing squirrel monkeys. Radiographically, after three months, ten of 11 monkeys consuming vitamin D_2 and three of three monkeys fed no vitamin D had decreased mineralization of their bones which was especially evident at the epiphyseal plates of long bones. Eleven of 12 monkeys consuming vitamin D_3 had no change or increased bone mineralization. The width of the epiphyseal plate at the distal end of the radius increased from a mean of 0.58 mm to 1.59 mm among monkeys fed vitamin D_2 for three months, while mean width decreased from 0.52 mm to 0.50 mm among monkeys fed vitamin D_3 . There was no apparent dose-related difference among either the D_2 or D_3 fed animals. On the basis of this experiment it appears that levels of vitamin D_2 up to 10 IU/g of diet are inadequate to prevent rickets while the lowest level of vitamin D_3 tested, 1.25 IU/g of diet, prevented the disease in this species. - Authors' summary.

162. Bullock, B. C. (Bowman Gray School of Medicine, Winston-Salem, North Carolina 27103) and J. A. Bowen. 1966. *Rickets and osteomalacia in squirrel monkeys* (*Saimiri sciureus*) (abstract). Federation Proc. 25: 533.

Four young squirrel monkeys born in the laboratory had awkward gaits and enlarged epiphyses. Their mothers were fed Purina Monkey Chow during the latter part of gestation and during lactation. The young monkeys were fed 45% ground Purina Monkey Chow, 5% casein, 48% boiled eggs and 2% of a vitamin mix, which provided 900 IU D_2 and 27 IU D_3 /100 g. The animals consumed no more than 30 g of diet/day. One monkey died at nine months, another at 11 months and a third at 18 months. All had rickets with wide irregular epiphyseal discs and poorly mineralized bone with wide osteoid borders on trabeculae. The fourth monkey was placed in a room with access to sunlight and given a vitamin D_3 supplement. It is now two years old and has improvement of the rachitic changes but has permanent skeletal deformity demonstrable radiographically. Two adult monkeys fed Purina Monkey Chow for one year had osteomalacia and pathological fractures. One died and the other was given 400 IU vitamin D_3 per day. During five months, serum phosphorus rose from 2 mg% to 7.6 mg% while alkaline phosphatase levels fell from 26 to 12 BLB units with marked clinical improvement and increased bone density. - Authors' summary.

163. Nebel, L. (Hebrew University, Hadassah Medical School, Jerusalem, Israel) and A. Ornstein. 1966. *Effect of hypervitaminosis D₂ on fertility and pregnancy in rats*. Israel J. Med. Sci. 2: 14-21.

Overdoses of vitamin D₂ were administered daily to rats starting on different days before or after mating. It was observed that high daily doses, administered six to seven days before mating, resulted in changes in the estrus cycle of the female rats and impeded fertilization. Administration of the same doses of vitamin D₂ beginning from the day of mating or a few days before or after fecundation, modified the structure of decidua, altered the process of implantation and produced degeneration and resorption of the implanted blastocysts. Administration of vitamin D₂ overdoses begun later, from the fifth day of pregnancy onwards did not alter the gestation, and spontaneous delivery ensued with apparently normal offspring. The possible mode of action of hypervitaminosis D₂ on fertility and pregnancy is discussed. - *Authors' summary*.

164. Fox, M. R. S. (Food and Drug Administration, Washington, D. C. 20001), G. A. Hudson, and Mary E. Hintz. 1966. *Pantothenic acid requirement of young Japanese quail* (abstract). Federation Proc. 25: 721.

Day-old Japanese quail were fed a purified diet containing: soybean protein 35%, glycine 1, DL-methionine 0.6%, salts 6%, corn oil 4%, dextrose 53.2%, required vitamins, and ethoxyquin. Ca pantothenate was fed at levels from 0 to 200 mg per kg diet. The respective adverse effects of the deficiency and the levels of calcium pantothenate required to prevent them were: mortality 15 mg/kg, slow growth 15 mg/kg, abnormal feathering especially the shaft) 30 mg/kg. Dermatitis, feather depigmentation, and gross adrenal hemorrhages were not observed. Length of the primary wing feathers at one week of age was closely correlated with level of dietary pantothenate from 0 to 40 mg/kg. Birds fed 40 mg calcium pantothenate/kg diet for one week subsequently required only 10 mg/kg for normal development up to four weeks of age. The total pantothenic acid in the birds' livers at four weeks ranged from 70 to 100 µg/g. Most of the liver pantothenate was in the form of coenzyme A. The diet of the stock colony birds contained 8-11 mg pantothenic acid/kg. The effect of the pantothenate level in the breeder diet on the young quails' requirement is under study. These data indicate that young Japanese quail have a high requirement for pantothenic acid compared with other birds and other species of experimental animals. - *Authors' summary*.

165. Seronde, J., Jr. (Harriet G. Bird Memorial Laboratory, Stow, Massachusetts 01775). 1966. *Duodenal lesions in mice intensified by complete synthetic diet* (abstract). Federation Proc. 25: 534.

The lesions consist of avillous plateaus of mucosa, found just below the pyloric valve. Overgrowth of crypts and atrophy of villi appear to be the responsible mechanism. Eighteen weanling mice were fed a synthetic diet for four weeks. Twenty-one controls were fed a stock diet. In the experimental group, 83% had lesions, averaging 6.5 mm. In the controls, 29% had lesions, averaging 0.5 mm. The lesion resembles the duodenitis which precedes ulceration in pantothenate-deficient rats. The pathogenesis of similar ulcers has not yet been studied in the mouse, but it is likely that mouse ulcers develop upon these avillous areas which are accentuated in pantothenate deficiency. - *Author's summary modified*.

166. Chahl, J. S. (University of Queensland, Brisbane, Australia) and C. C. Kratzing. 1966. *Environmental temperature and choline requirement in rats. I: Choline deficiency in rats at various temperatures.* J. Lipid Res. 7: 17-21.

Rats were maintained at 2, 21, and 33 C for three weeks on a choline-supplemented or a choline-deficient diet. In contrast to the findings of some other workers, choline deficiency produced fatty livers at all temperatures. The ratio of the total liver lipid to the total food intake was the same in all choline-supplemented rats. In choline-deficient rats this ratio was always higher and varied directly with temperature. - *Authors' summary.*

167. Chahl, J. S. (University of Queensland, Brisbane, Australia) and C. C. Kratzing. 1966. *Environmental temperature and choline requirements in rats. II: Choline and methionine requirements for lipotropic activity.* J. Lipid Res. 7: 22-26.

Young rats were fed choline-deficient diets and maintained at different environmental temperatures. The hepatic lipid level remained normal in rats at 2 C when 25 mg of choline per 100 g of food was fed; 50 mg of choline per 100 g food was required at 21 C and 100 mg of choline per 100 g food at 33 C to prevent excessive lipid accumulation. These values were equivalent to a mean daily intake per rat of 3 mg of choline at 2 C, 5.5 mg at 21 C, and 7 mg at 33 C respectively. When the growth rate was slower owing to a slight inadequacy of histidine in the basal choline-deficient diet, normal hepatic lipid was maintained by supplements of 50 mg of choline per 100 g food at 21 and 33 C. Increasing the methionine content of the diet two- or three-fold from a basal value of 340 mg per 100 g food was as effective as 200 mg of choline per 100 g of food in lowering hepatic lipids at 2, 21, and 33 C. - *Authors' summary.*

168. Kwong, Eva (Cornell University, Ithaca, New York 14850) and R. H. Barnes. 1966. *The relationship of age to the effects of choline deficiency and coprophagy on liver choline biosynthesis in the rat* (abstract). Federation Proc. 25: 542.

During the first four weeks after weaning, choline biosynthesis in the liver is depressed in conventional choline-deficient rats but remains at a normal high level when coprophagy is prevented. Six to eight weeks after weaning, liver choline biosynthesis drops to a lower level which is not affected by choline deficiency or coprophagy prevention. Choline biosynthesis in the choline-deficient rat appears important in protecting it during the critical early period of the deficiency. - *R. J. Flynn.*

169. Hunt, C. E. (Massachusetts Institute of Technology, Cambridge, Massachusetts 02139), W. W. Carlton, and P. M. Newberne. 1966. *Copper-deficiency in rabbits* (abstract). Federation Proc. 25: 432.

Dutch belted rabbits were weaned at five weeks and raised on a copper deficient diet. Control animals were fed a basal diet plus 6 ppm copper. Copper deficiency was evidenced by a decreased rate of growth, anemia, and loss of fur and pigment. Cytochrome oxidase activity was determined on liver

biopsy samples at eight weeks and on liver and heart terminally (14 wk). Activity in the liver of copper deficient animals was about one-half that of the controls for both periods. Activity in the heart of copper deficient animals was two-thirds that of the controls, whereas it was one-third that of the controls in animals receiving 1% ascorbic acid in the basal diet. The latter group also developed gross bone lesions (5/7). Medial curvature of the forelimbs, involving the radius and ulna, appeared after five weeks. Cortical thinning as well as increased width and distortion of the epiphyseal cartilage was present. There seemed to be an excessive destruction of bone giving the appearance of a diffuse osteoporosis. - *Authors' summary.*

170. Schwarz, K. (Veterans Administration Hospital, Long Beach, California 90804), J. C. Smith, and T. A. Oda. 1966. *Factor G, an agent promoting growth of animals on amino acid diets* (abstract). Federation Proc. 25: 542.

A new dietary factor enhancing growth of rats on amino acid diets (Factor G) was studied. L-amino acid/sucrose diets with 5% fat were used. Supplements of 3-5% yeast, liver powder, and other natural products enhanced growth of Sprague Dawley rats by 1-1.8 g/day/animal. Doubling of the amino acid level, and addition of the individual known amino acids or of 5% serum albumin, fibrinogen, casein, zein, edestin, and other proteins were without Factor G effect, in contrast to egg albumin and to casein at higher levels. Ashing destroyed the activity; supplementation of many elements in trace quantities produced no response. Factor G is water soluble but is not readily extracted from yeast with water or hot ethanol. - *Authors' summary modified.*

171. Smith, J. C. (Veterans Administration Hospital, Long Beach, California 90804) and K. Schwarz. 1966. *Trace factor deficiency in rats in an ultraclean environment* (abstract). Federation Proc. 25: 432.

A metal- and glass-free ultraclean environment has been developed for studying the essentiality of specific trace elements. Completely plastic isolators supplied with filtered air were constructed, and animal cages made of plastic material were designed so that no bedding material was required. Likewise, all supporting equipment was made of plastic. Twenty-five weanling male Fischer 344 rats were used per incubator to test the system. Animals on a purified amino acid diet containing known trace factors exhibited a marked impairment of growth and other deficiency symptoms in the ultraclean environment. A severe alopecia developed within two to three weeks in animals inside the isolators while the outside controls on the amino acid ration in metal cages looked well. In contrast, animals on laboratory chow in the ultraclean environment grew as well as those maintained outside and showed superior physical appearance. The results suggest that animals in the ultraclean environment receiving the purified amino acid diet were deficient in unidentified trace factors which are available to controls on the same diet in the conventional environment. - *Authors' summary.*

ENVIRONMENT

GENERAL CONSIDERATIONS, TEMPERATURE, HUMIDITY

172. MacNintch, J. E. (Bowman Gray School of Medicine, Winston-Salem, North Carolina 27103), C. C. Middleton, T. B. Clarkson, R. W. St. Clair, and H. B. Lofland. 1966. *The effects of changing environment on serum cholesterol levels in squirrel monkeys* (abstract). Federation Proc. 25: 388.

Serum cholesterol values for squirrel monkeys (*Saimiri sciureus*) have been reported by several laboratories, including our own, to be in the 175-200 mg% range. These animals are used extensively in studies on atherosclerosis. In a recent field survey, however, mean values near 100 mg% were observed. To study this apparent increase in cholesterol values, blood samples were drawn from a group of 30 monkeys within 2-3 hours after having been trapped near Leticia, Colombia, and again three weeks later while in a holding compound there. The animals were shipped to the U.S., sampled immediately upon arrival at the laboratory (eight weeks after capture), and at two subsequent monthly intervals. Serum cholesterol values were as follows: trap sample, 116 mg%; holding compound, 162 mg%; laboratory samples 1, 2 and 3 were 194 mg%, 170 mg% and 171 mg%, respectively. To date, serum cholesterol values have not returned to "bush" levels. Diet, stress of capture or confinement, laboratory housing or other factors could be implicated. Investigators using these animals, especially in diet or drug studies, should recognize that a significant hypercholesterolemia may exist, due to whatever cause, at the start of the experiment. - *Authors' summary.*

173. Prichard, R. W. (Bowman Gray School of Medicine, Winston-Salem, North Carolina 27103). 1966. *Effect of environment on cholesterol-fed white carneau pigeons* (abstract). Federation Proc. 25: 598.

Environmental stress is accounted an important factor in the genesis of degenerative vascular disease in zoo animals. Discrepancies in different experiments on estrogen effects in cholesterol-induced chicken atherosclerosis may relate to different caging conditions. Accordingly, 12 six-week old male pigeons were placed in a farm loft with a large enclosed space for limited flying. A second group of 13 birds was placed in an indoor battery cage with no flying space. Both groups were fed pigeon pellets soaked with 1% cholesterol and 4% lard. After 210 days, blood was drawn and the birds were killed. Serum cholesterol levels and aortic atherosclerosis indexes were determined. Five frozen sections on each of three heart blocks were stained with Sudan IV-hematoxylin and the presence or absence of coronary artery disease, percent arteries involved by plaques, average percent lumen stenosis, maximum percent lumen stenosis, average percent fat in plaques and maximum percent fat in plaques determined. Analysis of variance and chi square tests showed only one difference, significant at the 1% level. This was in serum cholesterol (farm mean 717 mg% SE 48.3; indoor mean 966 mg% SE 97.9). Since the study period was relatively short the difference in serum cholesterol values may not have had time to produce differences in manifestations of atherosclerosis. - *Author's summary.*

174. Doss, D. (Institut für Pharmakologie, Universität Kiel, Kiel, German Federal Republic) and F. K. Ohnesorge. 1966. *Motilität und Körpertemperatur von Mäusen in verschiedenen Umgebungstemperaturen (Motility and body temperature of mice at different ambient temperatures)*. Pfluegers Arch. Ges. Physiol. 289: 91-97.

Mice were kept singly for 2 1/2 hours at ambient temperatures of 15, 20, 25, 30 and 35 C. At 15-25 C the average body temperature was 36.6 C. It rose to 38.8 C at 35 C. The motor activity was minimal at 25 C. It rose at lower and higher ambient temperatures. The percentage of quiet mice increases with rising temperature up to 25 C, but decreases at ambient temperatures higher than 25 C. The relationship between motor activity and body temperature was linear at all ambient temperatures. The effect of motor activity on the body temperature was more pronounced in cool surroundings than in warm ones. - *Authors' summary modified.*

175. Müller-Beissenharts, P. (Institut für Pharmakologie, Universität Kiel, Kiel, German Federal Republic) and F. K. Ohnesorge. 1966. *Der Sauerstoffverbrauch von Mäusen in verschiedenen Umgebungstemperaturen (The oxygen consumption of mice at different ambient temperatures)*. Pfluegers Arch. Ges. Physiol. 289: 98-108.

The relationship between oxygen consumption and motor activity in normal mice, which were kept in ambient temperatures of 15, 20, 25, 30, and 35 C for 2 1/2 hours is reported. A linear relationship existed between motor activity and oxygen consumption at all ambient temperatures. The regression coefficients were equal at ambient temperatures of 20, 25, and 30 C, they were higher at 15 and 35 C. The oxygen consumption decreased linearly with rising ambient temperature. The oxygen consumption was minimal at 30 C and rose again at 35 C. At all ambient temperatures a linear correlation was observed between body weight and oxygen consumption. The effect of body weight on the oxygen consumption increased with decreasing ambient temperature. It was minimal at 30 C and rose again at 35 C. - *Authors' summary.*

176. Hémon, P. (Laboratoire de Physiologie comparée, Faculté des Sciences, Paris 5, France). 1966. *Effet de la thyroxine sur la consommation d'oxygène du rat blanc au cours du développement post-natal: II. Importance de la température externe (Effect of thyroxine upon oxygen consumption of the albino rat during postnatal development. II. Importance of external temperature)*. J. Physiol. (Paris) 58: 41-48.

The oxygen consumption of young rats, ten days old, fasted and resting, was determined at an external temperature of 35 C. Then some of them were injected with DL-thyroxine. The oxygen consumption of all the animals was determined again two days later, at the age of 12 days, under the same conditions. Thyroxine increased the oxygen consumption per unit body weight by approximately 25%. This result is discussed and an interpretation of results previously obtained at an external temperature of 29.5 C is proposed. - *Author's summary.*

177. South, F. E. (University of Missouri, Columbia, Missouri 65201), R. K. Andjus, and M. R. Gumma. 1966. *Acclimatization to deep hypothermia by rats* (abstract). Federation Proc. 25: 515.

This study was designed to explore responses of animals repeatedly subjected to deep hypothermia and to test limits of adaptation. The body temperatures of rats (males and females) were lowered to 0 C for increasing durations (40 minutes for the first two trials, 60 minutes for the third through seventh and 120 minutes subsequently). Indices of adaption were the ability of an animal to thermoregulate one hour after reanimation when placed in successive environments of 0 C (30 minutes), 33 C (60 minutes) and 24 C (21 1/2 hours), restoration of body weight, and the absence of neurological signs. Weight losses reached maximum values for both sexes, about 25% for males and 21% for females following the third induction. Thereafter, weight losses were progressively less; males improving more than females. Neurologic signs, such as partial paralysis, and hyperirritability markedly diminished. After each trial the thermoregulatory test revealed progressive improvements. The results demonstrate increased tolerance to induced hypothermia on repetitive exposures. - *Authors' summary modified.*

178. McGinnis, S. M. (California State College, Hayward, California 94542). 1966. *Sceloporus occidentalis: preferred body temperature of the western fence lizard*. Science 152: 1090-1091.

Given equal thermal opportunities during four seasonal test periods, western fence lizards, active above ground, preferred constant body temperature throughout the year. Lizards recovered from subsurface retreats in the fall exhibited a mean body temperature significantly lower than that for sequestered lizards recorded during winter, spring, and summer. - *Author's summary.*

179. David, J. (Faculté des Sciences de Lyon, Rhône, France) and Marie-Francoise Clavel. 1966. *Essai de définition d'une température optimale pour le développement de la Drosophile* (Trials to define the optimum temperature for the development of *Drosophila*). Compt. Rend. 262: 2159-2162.

Drosophila melanogaster is usually maintained in the laboratory at 25 C but it is not known if this temperature is the best for this species. In an attempt to determine the optimum temperature, eggs were incubated at 12, 13, 14, 19, 25, 28, 30, and 31 C. Observations were made of the time of development, and the mortality and variability of the individual. It was concluded that the optimum temperature is between 19 and 25 C and probably about 21 C. - R. J. Flynn.

NOISE, LIGHT, GROUPING, OTHER FACTORS

180. Geber, W. F. (Medical College of Georgia, Augusta, Georgia 30902), T. A. Anderson, and B. Van Dyne. 1966. *Physiologic responses of the albino rat to chronic noise stress*. Arch. Environ. Health 12: 751-754.

A group of albino rats was subjected to auditory stress at levels and durations within the limits that might be expected to be encountered in many present day situations. Parameters studied were level of circulating eosinophils, adrenal ascorbic acid, brain ascorbic acid, adrenal weight and serum cholesterol. A marked response to short periods of auditory stress was demonstrated between 68 and 71 decibels. When auditory stress was administered over a prolonged period (21 days) the measured parameters were still responding at the end of this period. The data indicated that the mammalian ear does not adapt to this type of stress as long as there are sufficient low troughs (relative silence) in the auditory environment between the stress periods. - R. W. Camden.

181. Alleva, J. J. (Food and Drug Administration, Washington, D. C. 20204) and E. J. Umberger. 1966. *Erratic timing of ovulation in hamsters exposed to constant light* (abstract). Federation Proc. 25: 251.

It is well known that the time of ovulation in rats can be changed at will by rotation of the light-dark cycle. However, it has been reported that hamsters exposed to constant light continue to display regular four-day vaginal estrous cycles and to ovulate; this suggests that cyclic light may not be the factor controlling time of ovulation in hamsters. The authors confirmed this finding. However, they found that the timing of ovulation became erratic. Hamsters exposed daily since birth to fluorescent light from 6:00 AM to 6:00 PM and displaying regular four-day vaginal estrous cycles ovulated every four days between 1:00 AM and 3:00 AM, as evidenced by the appearance of ova in the Fallopian tubes. Hamsters removed from this lighting at 31 to 79 days of age and exposed to constant light for about 70 days either failed to ovulate by 9:00 AM or ovulated between 3:00 AM and 9:00 AM. Those that ovulated were younger than those that did not. It is concluded that hamsters, like rats, time ovulation by entrainment to the light-dark schedule. Constant light also induced a significant increase in body weight. - Authors' summary modified.

182. Reiter, R. J. (Edgewood Arsenal, Maryland 21010), R. J. Hester, and C. C. Hassett. 1966. *Thyroidal-pineal-gonadal interrelationships in dark-exposed female hamsters* (abstract). Federation Proc. 25: 252.

Environmental lighting affects both thyroidal and reproductive functions of laboratory rodents. Since the effects of light (or darkness) may be mediated via the pineal gland, the authors tested the influence of the daily photoperiod on the pituitary-thyroidal and pituitary-ovarian axes of female golden hamsters. Groups of animals were kept in either long [light:darkness (LD) 16:8 hours] or short (LD 1:23) daily photoperiods, were given either fresh water or 1% aqueous thiourea to drink and were either pinealectomized or sham operated. Animals were treated for 35 days. Thiourea treatment caused thyroidal hypertrophy in all hamsters but the degree of hypertrophy was significantly greater in animals kept in LD 16:8. This finding suggests

that darkness decreases thyroidal activity in hamsters. Short photoperiods alone caused atrophy of the ovaries and uteri whereas thiourea treatment in both light cycles resulted in regression of the reproductive organs. In LD 1:23 cycles (but not in LD 16:8), however, pinealectomy prevented regression of uteri of thiourea-treated hamsters. Increased ovarian sensitivity to gonadotrophins and removal of antagonistic factors (by pinealectomy) may possibly explain these results. - *Authors' summary modified.*

183. Price, E. O. (Michigan State University, East Lansing, Michigan 48223). 1966. *Influence of light on reproduction in Peromyscus maniculatus gracilis*. J. Mammal. 47: 343-344.

Increased reproduction was obtained in a laboratory colony of *Peromyscus maniculatus gracilis* by increasing the light phase of the diurnal cycle from 12 to 15 hr. - *E. F. Staffeldt.*

184. Holmquest, D. L. (Baylor University College of Medicine, Houston, Texas 77025), K. Retiene, and H. S. Lipscomb. 1966. *Circadian rhythms in rats: effects of random lighting*. Science 152: 662-664.

Increase in body weight, spontaneous running activity, and adrenal cortical function have been studied in rats exposed to a random lighting schedule. In two separate experiments, grouped control animals were given 12 or 14 hours of light alternating with 12 or ten hours of darkness, respectively, while corresponding grouped experimental animals were given the same total amounts of light and darkness per 24-hour period in a randomized pattern. Random light for periods of 17 to 40 days exerted no influence on growth rate, on weights of endocrine organs, or on adrenal response to adrenocorticotrophic hormone. However, the physiological fluctuation of group running activity and adrenal steroid secretion was abolished. Group desynchronization and the development of circadian rhythms having periods both shorter and longer than 24 hours appear to have replaced the synchronized group rhythmicity. - *Authors' summary.*

185. Gruzdev, G. P. (Moscow, U.S.S.R.), L. M. Rozhdestvensky, M. I. Fedotova, and E. N. Shcherbova. 1966. *The diurnal rhythm of mitotic activity in the bone marrow of the rat* (in Russian). Biul. Eksp. Biol. Med. 61: 83-84.

The mitotic activity of the bone marrow was determined in normal rats of the Wistar strain at different times of the day and night. From 18 to 20 animals were examined at a time. The results showed no evidence of variations in the mitotic activity during the diurnal period in the bone marrow of the rat. - *Authors' summary modified.*

186. Bogatova-Nikanorova, R. I. (Institute of Experimental Biology, U.S.S.R. Academy of Medical Sciences, Moscow, U.S.S.R.). 1966. *Diurnal rhythm of mitotic activity in certain tissues of young albino rats* (in Russian). *Biul. Eksp. Biol. Med.* 61: 110-112.

A study was made on the diurnal rhythm of mitotic activity in the glomerular zone of the adrenal gland and in the corneal epithelium in seven- and 17-day-old rats and their mothers respectively. It was found that the diurnal rhythm of mitoses in seven-day-old and 17-day-old rats and their mothers respectively in the glomerular zone of the adrenal was not identical. On the other hand, it was noted that the diurnal rhythm of mitoses in the glomerular zone in the lactating females under investigation also differed from the rhythm noted in normal adult rats. By the 17th day, a diurnal mitotic rhythm similar to that in adult animals was established in the corneal epithelium. - *Author's summary.*

187. Thomas, R. E. (U. S. Army Medical Laboratory, Fort Baker, California 94965) and J. E. Kittrell. 1966. *Effect of altitude and season on the canine hemogram*. *J. Am. Vet. Med. Assoc.* 148: 1163-1167.

The effects of altitude and season on the erythrocyte (RBC) count, hemoglobin (Hb) content, and packed cell volume (PCV) were studied in the German shepherd. Most of the dogs studied were adult males in good health. All three values were significantly lower in 100 dogs arriving at 6,000 ft from various, generally lower altitudes than they were in 40 dogs residing at 6,000 ft for longer than six months. Relocation of 18 dogs from 6,000 to 10,000 ft for six weeks resulted in a significant increase in Hb in four weeks. At six weeks, differences were not statistically significant. After spending 60 days at sea level, the dogs had significantly lower Hb and PCV. Blood samples were obtained from 30 dogs in December and January (winter) and again in May (spring). The RBC, Hb, and PCV values were significantly higher in the winter. - *Authors' summary.*

188. Baird, B. (White Mountain Research Station, Bishop, California 93514) and S. F. Cook. 1966. *Neurologic, musculoskeletal and vascular responses to mountain hypoxia* (abstract). *Federation Proc.* 25: 190.

Discontinuous chamber and continuous high mountain hypoxias (3800 m) cause intense prenatal and postnatal responses in laboratory mice and rats and in wild mountain deer mice. To study the effects of less intense continuous hypoxia, 13 nulliparous Swiss mice were adapted to altitude and bred at 3100 m. This elevation represents a generally accepted level at which the effects of hypoxia become physiologically severe. Nociceptive reflexes, righting movements, suckling and other motor activities were tested postpartum. Muscular and skeletal impairment, including shortened and deformed limbs, unilateral and bilateral clubfoot and cleft palate were noted in five of 125 mountain neonates. Intracardiac studies on 103 surviving mountain progeny disclosed five ventricular septal defects. Patent ductus arteriosus, with or without atrial dilatation, occurred in four of 80 neonates conceived and born on the mountain, in none of 23 gestating at altitude but flown to sea level by helicopter two days before term, and in none of 97 sea level controlled neonates. - *Authors' summary modified.*

189. Ropartz, P. (Laboratoire de Psychophysiologie, Faculté des Sciences, rue de l'Université, Strasbourg, France). 1966. *Contribution à l'étude du déterminisme d'un effet de groupe chez les souris (Contribution to the study of a group effect in mice)*. Compt. Rend. 262: 2070-2072.

The group effect in mice is at least partially an olfactory response. Adrenal weights of individually isolated male C57BL/6 mice increased when they were exposed for eight days to a current of air which crossed a population of adult male mice. No significant difference in testis weight occurred. - D. L. Ford.

190. Folman, Y. (Volcani Institute of Agricultural Research, Rehovoth, Israel) and D. Drori. 1966. *Effects of social isolation and of female odors on the reproductive system, kidneys and adrenals of unmated male rats*. J. Reprod. Fertility 11: 43-50.

Unmated male rats were raised in social isolation and grouped, and mated males were raised in cohabitation with hysterotomized females. The unmated males were raised under conditions providing different intensities of female odors. In isolation, the penis muscles, levator ani, penis and the seminal vesicle tissue of the males exhibited a relative atrophy similar in degree to that prevalent in grouped males. Isolated males grew faster and had larger ratios of kidney to body weight and adrenal to body weight than grouped males. A correlation between these two ratios was observed. Continuous exposure to female odors from weaning to 136 or 240 days of age, did not affect the general atrophy of the accessory reproductive organs either in isolated or in grouped, unmated males. Grouping and exposure to female odors reduced the amount of secretion contained in the seminal vesicles and the size of the bulbourethral glands. It was concluded that social conditions, i.e. isolation and grouping, and continuous exposure to female odors, have only minor effects on the reproductive system of unmated males; conversely, under conditions of cohabitation, heterosexual mating is the factor responsible for preventing the atrophy of the reproductive system in males. - Authors' summary.

191. Evans, C. S. (Oregon Regional Primate Research Center, Beaverton, Oregon 97006) and S. A. Barnett. 1966. *Physiological effects of "social stress" in wild rats: 3. Thyroid*. Neuroendocrinology 1: 113-120.

Adult male wild rats, *Rattus norvegicus*, were exposed, for 10 to 60 min, to attack by a fierce male of the same species. There was little or no wounding, yet 15 of 21 died within six days of exposure. Ten controls put in an empty cage for similar periods all survived. In seven rats that survived long enough for a count to be taken, thyroid secretion, recorded by means of ^{131}I release curves, was reduced for about 24 hr. Six other rats died during a period of thyroid inhibition. The period of inhibition began 4-59 hr after exposure to attack. Ten controls showed no inhibition. In similar rats, similarly attacked, reduced adrenal ascorbic acid indicated raised adrenal cortical activity. The thyroid inhibition was evidently a secondary result of central nervous arousal, perhaps mediated by a decline in the output of thyroid-stimulating hormone. - Authors' summary modified.

192. Zalis, E. G. (97th General Hospital, APO 09757, U.S. Forces Europe) and G. Kaplan. 1966. *The effect of aggregation on amphetamine toxicity in the dog*. Arch. Intern. Pharmacodyn. 159: 196-199.

The effects of aggregation and the influence of other environmental factors on the toxicity of amphetamine was studied in dogs. Aggregation was found to increase the toxicity of amphetamine to 1.3 times that for a control group of animals which were individually housed. An increase in ambient temperature by 11 F as well as decreased area of confinement and frequent external stimuli failed to significantly alter the toxicity for solitary animals. The slight increase in toxicity in the aggregated group was attributed to the excitatory effect of aggregation. - *Authors' summary*.

193. Wenzel, D. G. (University of Kansas, School of Pharmacy, Lawrence, Kansas 66044) and L. L. Broadie. 1966. *Effect of group size and cage design on voluntary running activity of amphetamine-treated mice*. Arch. Intern. Pharmacodyn. 159: 154-160.

The voluntary running activity of mice in groups of two, three, four, and five was measured by counting the number of times a light beam was interrupted in three types of cages. The larger group sizes were found to cause an apparent increase in activity as measured in a cage with an unreflected beam, whereas, in cages with an extended (reflected) beam, the number of times the beam was interrupted was not increased because of the mutual interference which occurs in groups of four or five. - *Authors' summary modified*.

GENETICS, SPECIAL STRAINS, STRAIN EFFECTS

194. Koloss, E. I. (Medical Institute of the town of Andijan, Andijan, U.S.S.R.). 1966. *On the changes of iris muscles of white mice during long-term experiments* (in Russian). Zh. Obshch. Biol. 27: 117-127.

Six generations of white mice were exposed to sharp illumination. Every new generation showed an ever increasing strength of the iris muscles. Their transformation proceeds by two stages - hypertrophic and hyperplastic - resulting from both a peculiar training of animals during their ontogenesis and inheritance of ontogenetic changes of their parents. The seventh generation was grown under a natural illumination of the vivarium. These individuals partially inherited muscular changes of the preceding six generations. Based on the experiments, the author believes that the transformation of muscular structures may occur under changed conditions of the function in the course of the entire ontogenesis of the organism. When similar conditions of existence are repeated in next generations, these microscopic changes are inherited, accumulated and transformed into macroscopic ones. The phenomenon is accompanied by a gradual change of the processes which take place at earlier ontogenetic stages. - *Author's summary.*

195. Clark, D. L. (Michigan State University, East Lansing, Michigan 48223). 1966. *Fertility of a Peromyscus maniculatus x Peromyscus melanotis cross.* J. Mammal. 47: 340.

One litter of all male F₁ hybrids was produced from a female *Peromyscus maniculatus bairdii* x male *P. melanotis* mating. The male hybrids were fertile when backcrossed to female *P. m. bairdii*. - *E. F. Staffeldt.*

196. Homburger, F. (Bio-Research Institute, Cambridge, Massachusetts 02138), J. R. Baker, and C. W. Nixon. 1966. *Myopathic Syrian hamsters as disease models of muscular dystrophy and congestive heart failure* (abstract). Federation Proc. 25: 476.

Information obtained from large autopsy series, enzyme studies on serum and muscle, nutritional and pharmacologic studies, indicate that the hereditary (autosomal recessive) myopathy of Syrian hamsters has morphologic and enzymologic characteristics resembling those of certain human dystrophies. The progression of the myopathy, which causes death at an average age of 150 days, can be markedly accelerated by active exercise to the point of exhaustion, such as by swimming or use of treadmills. This causes severe muscle lesions to appear within hours and aggravates the cardiopathy. Even without exercise nearly all animals of the myopathic strain develop terminal congestive heart failure. This syndrome is aggravated by sodium load and prevented by sodium restriction. Ascites and edema respond to digitoxin and diuretics. New data thus extend and confirm earlier published observations and establish myopathic hamsters as useful models for the study of muscular dystrophy and cardiac failure. - *Authors' summary.*

197. Thompson, M. W. (University of Toronto, Toronto, Ontario, Canada), E. A. McCulloch, L. Siminovitch, and J. E. Till. 1966. *The cellular basis for the defect in haemopoiesis in flexed-tailed mice: 1. The nature and persistence of the defect.* Brit. J. Haematol. 12: 152-160.

The cellular basis for the severe transitory siderocytic anemia of flexed-tailed mice (*f/f*) has been studied using the spleen-colony method. Spleen colonies formed by cells from embryonic liver, eight-week adult marrow and seven-month adult marrow of *f/f* origin were found to be small in size and to possess a decreased ability to incorporate radioiron into heme. When marrow cells of *f/f* origin were transplanted into irradiated hosts, cells derived from the spleens of the recipient animals showed a low capacity to incorporate ⁵⁹Fe into heme from the sixth to the tenth day after transplantation, when compared with cells derived from normal *+/+* controls. After the tenth day, the difference in iron-incorporating ability between cells of normal and *f/f* origin decreased, with no difference being apparent after 30 days. These results indicate that hematopoietic colony-forming cells from the tissue of nonanemic adult animals are like those from anemic fetal animals, in that cells from both sources bear a defect which is manifested as soon as the cells undertake rapid proliferation. These findings are discussed in relation to the transient nature of the anemia in *f/f* mice.

- Authors' summary.

198. Gaman E. M. (New Jersey Bureau of Research, Princeton, New Jersey 08540) and A. S. Feigenbaum. 1966. *Familial influence on "spontaneous" lesions in rabbits* (abstract). Federation Proc. 25: 388.

A study of litters of several rabbit breeds suggest a familial factor in the incidence of spontaneous arteriosclerotic lesions in rabbits. A breeding colony started with two unrelated New Zealand White does (N-1, N-3), a Dutch doe (D-1) and several bucks has been under observation for two years. Rabbits of Both F_1 and F_2 generations of N-1 had a 67% incidence of spontaneous lesions contrasted with none in the progeny of N-3 and D-1. N-1 and D-1 were bred again and produced young on the same day. On the day of birth the young of D-1 were given to N-1 to nurse and four of N-1's babies were given to D-1, three N-1's babies remaining with their mother. The young were sacrificed at eight weeks of age and the aortas examined. None of the New Zealand Whites nursed by D-1 had lesions, whereas all the rabbits, both Dutch and New Zealand White, nursed by N-1 had lesions. Since spontaneous lesions are rare in Dutch rabbits, this latter experiment is being repeated in order to test the hypothesis that some factor in the milk of the mother rabbit may contribute to the formation of spontaneous lesions in rabbits. - Authors' summary.

199. Chaffee, R. R. J. (University of Missouri, Columbia, Missouri 65201). 1966. *Studies on experimental genetic selection for and against hibernation* (abstract). Federation Proc. 25: 274.

Studies were made to see if hibernation as a characteristic can be experimentally selected for or against. The Syrian hamster (*Mesocricetus auratus*) was used because it is the only inbred hibernating laboratory animal, and has a high degree of genetic homogeneity. Hamsters which failed to hibernate under conditions where others hibernated, were mated. Non-

hibernating offspring were inbred for three generations. The population which hibernated decreased significantly from 57% to 22%. Conversely inbreeding of hibernators for three generations resulted in a population in which a significantly higher percentage hibernated (74%). This suggests that with extensive selective breeding, both nonhibernating and hibernating lines can be obtained. Since the change in incidence of hibernation occurs within so few generations, the theory is proposed that hibernation involves only a few genes. - *Author's summary modified.*

200. Shrader, Ruth E. (University of California, Davis, California 95616) and G. J. Everson. 1966. *Congenital abnormalities of the ear of manganese deficient guinea pigs* (abstract). *Federation Proc.* 25: 432.

Disturbances of equilibrium, nystagmus, retraction, bobbing and lateral tilting of the head have been observed in guinea pigs born to females maintained on a ration deficient in manganese throughout pregnancy. Some accommodation of these symptoms occurs with increasing age. This accommodation cannot be accelerated, nor can normal behavior be achieved even by prolonged postnatal supplementation with manganese. Examination of X rays and cleared, whole-mount preparations of the ears of both deficient and supplemented animals revealed alterations in the shape and orientation of the semicircular canals and ampullae. Histological sections of the ear showed cellular disorganization and pathological alteration in the sensory epithelium of the maculae of the saccule and utricle, abnormalities of the otoliths and cristae amularis. The structural and cellular changes observed appear to be unaltered by supplementation with manganese. - *Authors' summary.*

201. Hurley, Lucille S. (University of California, Davis, California 95616), L. Erway, and A. Fraser. 1966. *Phenocopy and prevention of a mutant ear defect by manganese* (abstract). *Federation Proc.* 25: 432.

Studies on genetic-nutritional interactions in the mouse were begun with the production of a maternal dietary deficiency of manganese. This resulted in congenital ataxia in the offspring similar to that previously reported in rats and guinea pigs. The abnormal condition was especially apparent in the inability of the animals to orient themselves when submerged in water. The ataxia appeared to be a phenocopy of the condition observed in mice homozygous for a mutant gene (pallid) known to affect differentiation of the otoliths within the inner ear. When female pallid mice were given the usual laboratory stock diet, 60% of their progeny were ataxic. Supplementation with manganese during pregnancy resulted in offspring of whom none showed the defect. Cleared, whole-mount specimens of the otic capsules of manganese-deficient and mutant mice were examined, and the presence or absence of otoliths was noted. The behavioral defects correlated with absence of otoliths in all groups. These results represent the first time that the differentiation of a genetic defect has been permanently prevented in a mammal by an environmental manipulation. - *Authors' summary.*

202. Backus, Beverly (George Washington University School of Medicine, Washington, D. C. 20005) and V. H. Cohn. 1966. *Genetic influences in metabolism of hexobarbital in mice* (abstract). Federation Proc. 25: 531.

The duration of hexobarbital-induced sleeping time was found to vary with sex and strain, and correlated, in general, with the metabolism of hexobarbital by liver homogenates. Inbred strains of mice having a short sleeping time metabolized hexobarbital *in vitro* to a greater extent than mice from strains with a longer sleeping time. F_1 hybrids tested had sleeping times and metabolic activities intermediate to those of the parent strains. In most of the strains tested, female mice slept a shorter time after administration of hexobarbital than males of the same strain. Similarly, liver homogenates from females metabolized a greater amount of the drug than those from males of the same strain. - *Authors' summary.*

203. Richardson, Flavia L. (Jackson Laboratory, Bar Harbor, Maine 04609). 1966. *Mammary tumors and mammary gland development in normal and estrogen-treated F_1 hybrids of strains C3H/J and RIII/An mice*. J. Natl. Cancer Inst. 36: 1167-1187.

A comparison of the rate of tumor development in F_1 hybrids of reciprocal crosses between the high-mammary-tumor strains C3H/HeJ and RIII/AnJ showed that the mean tumor age was higher and the incidence of mammary tumors was lower in the F_1 virgins with RIII mothers than in F_1 virgins with C3H mothers. Pellets composed of 20% diethylstilbestrol and 80% cholesterol were implanted subcutaneously into male and female mice and removed after eight weeks or left in for life. The mice used were F_1 hybrids of C3H/J and RIII/An with the mammary-tumor agent and F_1 hybrids of agent-free strains C3HeB and RIII/B. Less than half of the untreated F_1 virgins born to agent-free C3H or agent-free RIII mothers developed mammary tumors and these occurred only in old animals. Virgins exposed to diethylstilbestrol pellets for eight weeks developed a high percentage of mammary tumors whether or not the agent was present, but they occurred at a later age in agent-free females. The tumor incidence and mean tumor age in male and female hybrids with the agent were approximately the same as in male and female hybrids without the agent when the mice were treated for life with diethylstilbestrol. This indicates that in these hybrids the mammary-tumor agent is not an important factor in tumor formation if the animals are stimulated by exogenous estrogenic hormones for a long period. - *Author's summary modified.*

204. Walburg, H. E. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830), Edna I. Mynatt, and D. M. Robie. 1966. *The effect of strain and diet on the thirty-day mortality of X-irradiated germfree mice*. Radiation Res. 27: 616-629.

Germfree and conventionally reared mice of the inbred RFM and noninbred ICR and CF 1 strains were exposed at ~ 100 R/min to 500-1000 R of whole-body X rays (half-value layer 1.0 mm Cu). In each strain, germfree mice had a higher LD_{50/30} than their conventional counterparts, but the difference in LD_{50/30} between germfree and conventional mice varied with strain from 147

R for RFM males to 34 R for CF 1 mice. The LD_{50/30} of different strains varied only one-half as much in germfree mice as in conventional mice, and the order of strain radiosensitivity was different for conventional and germfree mice. Supplementation of the autoclaved diet with a filter-sterilized synthetic diet increased the LD_{50/30} of germfree ICR mice from 790 to 900 R, changed the slope of the mortality curve and the mean survival time, and decreased weight loss after irradiation. - *Authors' summary.*

205. Holmes, Margaret C. (University of Melbourne, Melbourne, Australia) and F. M. Burnet. 1966. *The characteristics of F₁ and backcross hybrids between "high leukaemia" (AKR) and "autoimmune" (NZB) mouse strains.* Australian J. Exptl. Biol. Med. Sci. 44: 235-250.

When female NZB mice were crossed with male AKR mice, the F₁ hybrids were more long-lived than either parent. Conversion from negative to positive Coombs test occurred much later than in NZB mice and 3-4 months earlier in F₁ females than in males. Kidney lesions were much rarer, but when they occurred they were of the same quality as in NZB mice. The incidence in backcrosses would suggest that a single gene pair is concerned. Thymic lesions in the F₁ group showed both the prelymphoma nodules of AKR mice and the germinal centers and other changes characteristic of NZB mice. Both were much more extensive in females than in males. Development of primary thymoma was delayed and many of the prelymphoma nodules showed no sign of activity, and would presumably not have initiated a frank lymphoma-leukemia. Lymphomatous tumors commencing in the thymus or elsewhere had a lower incidence and appeared later in the F₁ than in AKR mice. In the backcross to AKR mice a considerable number of early thymomas of AKR type were seen. Reticulum cell tumors of the spleen (48), plasmacytomas (16), and lympho-epithelial tumors of the thymus (5) were found among 161 neoplastic conditions in the three groups. - *Authors' summary modified.*

206. Fuller, J. L. (Jackson Laboratory, Bar Harbor, Maine 04609). 1966. *Variation in effects of chlorpromazine in three strains of mice.* Psychopharmacologia 8: 408-414.

Mice of strains C3HeB/J, C57BL/6J and RF/J were trained in nondiscriminated avoidance (Sidman type). Experimental subjects could terminate or defer shock by crossing between cage components. Controls received shock but could not control it. Chlorpromazine in doses up to 4 µg/g body weight had no effect on the activity of controls. Avoidance activity, defined as the excess activity of experimentals, was reduced by the drug, particularly in C57BL. C3H avoided best at all drug levels. The poorest strain, at low dosage, was RF, at higher dosage, C57BL. The results suggest need for care in the choice of phenotypes in experimental pharmacogenetics. - *Author's summary.*

209. Legator, M. (Food and Drug Administration, Washington, D. C. 20204), C. Jacobson, M. Perry, and D. Dolimpio. 1966. *The woolly opossum - a new research tool for cytogenetic studies*. Life Sci. 5: 397-402.

The suitability of the South American woolly opossum for cytogenetic studies are discussed. Because of its availability, adaptability to laboratory conditions, unique reproductive cycle, small chromosome number ($2n = 14$), discernible XY sex determination with adequate sex chromatin, and satisfactory autosomal differentiation, the woolly opossum is an excellent candidate for cytogenetic, teratogenic, and mutagenic studies. - R. J. Flynn.

210. Handler, A. H. (University of Pittsburgh Graduate School of Public Health, Pittsburgh, Pennsylvania 15213), S. I. Magalini, and Denise Pav. 1966. *Oncogenic studies on the Mongolian gerbil*. Cancer Res. 26: 844-847.

Possible use of the Mongolian gerbil as an experimental animal for oncologic studies was investigated. Several tumors were induced with X-irradiation and with 7,12-dimethylbenzanthracene. Homografts and perpetuation by serial transfer of these tumors were effected in this species. Human, mouse, and Syrian hamster tumors were successfully heterografted in gerbils conditioned with cortisone or X-ray. An induced lymphoma with conversion to leukemia was described and studied in detail. Preliminary studies suggested that this lymphoma may be used for assaying potential antitumor agents. Hematologic values were determined and cytologic and histologic studies of bone marrow, spleen, and liver were made for comparison with those of the mouse and the hamster. - Authors' summary.

211. Kharitonova, V. I. (Kharkov Medical Institute, Kharkov, U.S.S.R.). 1966. *Anatomy of the lacrimal glands in the rat* (in Russian). Biul. Eksp. Biol. Med. 61: 112-113.

Because the external orbital lacrimal gland is frequently mistaken for the parotid gland, the former is described in detail. - R. J. Flynn.

212. Babaeva, A. G. (Institute of Experimental Biology, U.S.S.R. Academy of Medical Sciences, Moscow, U.S.S.R.) 1966. *Postnatal development of the submaxillary salivary and the external orbital glands in albino rats* (in Russian). Biul. Eksp. Biol. Med. 61: 113-115.

The object of study was to characterize the growth of the submaxillary salivary and external orbital glands. The weight of the glands, the size of their lobules, acini, nuclei, and the mitotic activity of the secretory cells were determined. It was found that up to the age of 40 days the increase in gland weight is due mainly to the formation of new acini; the latter takes place by proliferation of the cells of the terminal portions. After the age of 40 days, the formation of new terminal portions occurs in a slight degree. The growth of the gland by the age of 75 days and later is due exclusively to an increase in the size of all structural components of the organ, and in the submaxillary gland, also to the appearance and growth of convoluted ducts. - Author's summary.

SPECIES AND STRAIN CHARACTERISTICS

GENERAL CONSIDERATIONS, GROSS MORPHOLOGY

207. Yablokov, A. V. (Institute of Animal Morphology, U.S.S.R. Academy of Sciences, Moscow, U.S.S.R.). 1966. *Some problems of studying variability of animals* (in Russian). Zh. Obshch. Biol. 27: 177-190.

Intrapopulation variability as such and as an important factor of evolution deserves to be studied independently from an investigation of systematics, ecology, morphology or genetics of a given group of animals. Regularities in such variability can be classified into the following categories: (1) elementary variability related to certain methods of studying variability (relation of the variation coefficient of the character to the absolute value of the character and dimensionality of characters within a certain system of organs); (2) higher variability that depends on the relations developing in the population - biogeocoenosis system (as exemplified by the phenomenon of comparative variability, i.e., maintenance of the position of a given character in the series of many other characters during different periods of the population existence despite significant changes in the absolute values of variability of characters). The fact that there is no commonly used classification of variability is an obstacle to its study. The classification advanced is based on the idea of a many-level character of the phenomenon of variability. This classification is subdivided as to its type (structural, functional, ethological), dimensionality (linear, weight, volume, surface, angular, temperature, time, colorimetric, meristic) and form with respect to natural factors (age, sex, chronography, generation, teratology, biotype, and geography). - *Author's summary.*

208. Dias de Avila-Pires, F. (Universidade do Brasil, Rio de Janeiro, Brazil). 1966. *On criteria for selection of laboratory primates*. Lab. Primate Newsletter 5: 21-22.

The author discusses the criteria used by experimental scientists for the selection of a given species as a laboratory animal. Evidently, the basic and general requirements are that the chosen animal must be easy to handle and to obtain, and that it must do well in captivity. These items, though, are not sufficient when it comes to the selection of an organism that is expected to provide definite answers to specific problems. Scientists should be more methodic and specific with the selection of subjects for their experiments. They should be at least as careful with the selection of their laboratory animals as they are when it comes to choosing instruments and scientific apparatus. For every type of work there must be a proper tool. The author concludes with the admonition that if the information needed to select more properly the subjects for experiments is lacking the answer is not to work blindfolded, but to do more basic research. - *R. J. Flynn.*

213. Devi, N. S. (Medical College, Trivandrum, India) and F. Jacoby. 1966. *The submaxillary gland of the golden hamster and its postnatal development.* J. Anat. 100: 269-285.

An account is given of the histological structure, together with some histochemical data, of the hamster submaxillary gland in the adult and during its postnatal development. The parenchyma of the submaxillary gland consists of "mucoid" acini, intercalated ducts containing secretion granules, convoluted granular tubules and striated ducts. The secretion granules of the two granulated duct segments are not identical. At birth acini have not yet been formed, and the gland consists of ramifying systems of inter- and intralobular ducts, the latter ending in hollow terminal units. The terminal units are composed of two distinct types of cell, one a typical mucous cell, the other a smaller undifferentiated type of cell. The latter proliferates rapidly and differentiates into the definitive acinar cell, while the former regresses. Acini which develop more or less in accordance with Heidenhain's Adenomeren-Theorie are fully formed by the second week. Intercalated ducts show signs of secretion by the 14th day. Transformation of intralobular striated duct segments into convoluted granular tubules beginning at the end of the third week is usually accomplished by the fifth week, i.e. at the age at which the animal attains sexual maturity. No obvious sex-dimorphism was found. - *Authors' summary.*

214. Hayreh, S. S. (Charles University, London, W.C.1., England) and F. Vrabec. 1966. *The structure of the head of the optic nerve in rhesus monkey.* Am. J. Ophthalmol. 61: 136-150.

Normal eyeballs, with the optic nerve attached, were studied in 12 adult rhesus monkeys by different histologic techniques. The structure of the head of the optic nerve is described in detail. - *R. J. Flynn.*

215. Sutherland, Sheila D. (University of Manchester, Manchester, England). 1966. *The intrinsic innervation of the gall bladder in Macaca rhesus and Cavia porcellus.* J. Anat. 100: 261-268.

The cystic nerve plexuses in *Macaca* and *Cavia* were studied by neuro-histological and histochemical methods. They may be subdivided in both cases into five subsidiary plexuses comparable with those in the intestine. The equivalent of the myenteric plexus is situated on the outer surface of the single muscular layer. This subdivision is rather artificial for the plexuses are so interconnected that they form an extensive network throughout the whole thickness of the gallbladder wall. All the plexuses are ganglionated except the deep muscular plexus and the plexus entericus internus in *Cavia*. The mucosa in *Macaca* remains rugose even after distension, for it rests on a honeycomb reticular framework. Because of this the submucous plexus maintains a characteristic whorled appearance in this animal. - *Author's summary.*

216. Henkind, P. (Institute of Ophthalmology, University of London, London, England). 1966. *The retinal vascular system of the domestic cat*. Exptl. Eye Res. 5: 10-20.

The retinal vascular system of the domestic cat was studied clinically and by a variety of histological techniques. Fundus photographs and drawings were utilized to point out features of the retinal vasculature during life, and routine histology, electron microscopy, ink injections and digest preparations were used for *in vitro* study. While the present observations usually confirmed previous work on the retinal vascular system of the cat, a number of points of difference were noted. A comparison of the retinal capillaries with those of the choriocapillaris is provided. An arcuate arrangement of retinal arterioles was noted in cat, monkey and man, and is similar to that noted in other vascular beds. The retinal circulation of the cat was found to have many points of similarity with that of man.
- Author's summary.

217. Priestley, G. C. (University of Leeds, Leeds, England). 1966. *Rates and duration of hair growth in the albino rat*. J. Anat. 100: 147-157.

The rates and duration of hair growth in the albino rat have been studied by autoradiography of the fibers after daily injection of [³⁵S]cysteine. Although there are considerable differences between the four main fiber types they show a common pattern of length-growth rate which is uninterrupted at the constrictions in auchene and zigzag types. Within each fiber type differences in the duration of hair growth, rather than in growth rate, appear to account for differences in hair length, which may be associated with strain, sex, age, body region. - Author's summary.

HISTOLOGY, MICROFLORA

218. Sehgal, A. K. (Institute of Postgraduate Medical Education and Research, Chandigarh, India), R. N. Chakravarti, N. R. Mysorekar, and P. N. Chhuttani. 1966. *Intestinal villi in rhesus monkeys*. Nature 210: 972-973.

A report is given of the configuration of intestinal villi in apparently normal rhesus monkeys utilizing the technique of dissection microscopy. Twenty-two animals, which had been trapped 10-20 days previously, were killed and examined. Eighteen specimens from the duodenum, 46 from the proximal four inches of the jejunum and 24 from the terminal ileum were examined. Three types of villi were encountered: classical finger-like villi; tongue or leaf-like villi; and extra broad curved villi, irregularly arranged and branching. Ten specimens in the duodenum showed the third type of villi, seven revealed leaf-like villi, and one failed to show any villi because of excess mucus. Out of 46 specimens taken from the jejunum, 33 showed leaf-like villi three finger-like, seven mixed finger- and leaf-like, and two extra-broad curved villi. One specimen did not show any villi, the surface being denuded mechanically. Out of 24 specimens taken from the terminal ileum, 16 showed classical leaves, three, finger-like villi, three, mixed patterns, and two, extra-broad curved villi. - R. J. Flynn.

219. Goldman, I. L (Institute of Biological Physics, U.S.S.R. Academy of Sciences, Moscow, U.S.S.R.), I. I. Smertenko, and G. A. Vilkina. 1966. *Normal karyotype of mice of highly leukemic AKR strain* (in Russian). Biul. Eksp. Biol. Med. 61: 97-101.

A karyogram was drawn up for mice of the highly leukemic strain, AKR. The diploid number of chromosomes was equal to 40. In the cells of the bone marrow a differential calculation of 100 metaphasic plates was made, among which 10% were aneuploid cells. - *Authors' summary.*

220. Szepeswöl, J. (University of Puerto Rico School of Medicine, San Juan, Puerto Rico 00928), J. Santiago, and A. Roman. 1966. *Quantitative differences in pituitary cells of mice of various strains and on different diets* (abstract). Federation Proc. 25: 536.

Pituitary glands of mice of various strains were studied. It was found that in mice of the C57BL and I strains the acidophil cells in the pituitary are in the range of 50 to 55%, while in the A strain, there is only 21%. In mice of DBA/1, T.M., BALB/c and C3H strains the relative number of acidophil cells varies between 30 to over 40%. The basophil cells also vary greatly from 2-3% in mice of the C57BL, T.M. and BALB/c strains to as high as 11% in C3H mice. In mice of the C57BL strain maintained on a diet supplemented with egg yolk, there is a significant decrease in the pituitary acidophil cells. - *Authors' summary modified.*

221. Prentice, R. S. A. (Dalhousie University, Halifax, Nova Scotia, Canada), D. O. Waugh, and D. Yadav. 1966. *The structure of the proximal tubule - a morphologic study of basement membrane cristae and their relationships in the renal tubule of the rat* (abstract). Federation Proc. 25: 428.

Kidneys of rats were examined using thin section light microscopy and electron microscopy. Circumferential ridges on the inner side of the basement membrane were noted and designated cristae. In the basal region of the tubule cell, a well-defined pattern of linear compartments parallel to the basement membrane cristae was seen. Terminal cytoplasmic "villi" emanated from these compartments to make final contact with the basement membrane. Some of the compartments extended laterally at the base of the cell to interdigitate with compartments of adjacent cells. This occurred only in the plane parallel to cristae. It is concluded that these complex architectural relationships are probably related to the adhesion of cells to the basement membrane and to fluid transport. - *Authors' summary modified.*

222. Bealmear, M. (University of Notre Dame, Notre Dame, Indiana 46556) and R. Wilson. 1966. *Histological comparison of the thymus of germfree (axenic) and conventional CFW mice*. Anat. Record 154: 261-274.

The histology of the thymus of both germfree and conventional mice at days 0, 14, 50, and 168 supports the interpretation of the growth pattern of the thymus as a reflection of the lymphocyte population of the cortex and medulla. In general, the conventional thymus has more

small lymphocytes in the cortex and more lymphocytes migrating into the medulla than in its germfree counterpart. Hence it would seem that antigenic challenge stimulates lymphocyte production in the thymus cortex and initiates a chain of events that may eventually result in thymus lymphocytes populating the other lymphoid tissues of the body, or that may result in lymphocyte degeneration in the thymus and the subsequent release of a humoral factor that may stimulate the other lymphoid tissue to lymphocytopoiesis. - *Authors' summary.*

223. Nakao, K. (Albert Einstein College of Medicine, Bronx, New York 10461) and P. Mao. 1966. *Atypical mitochondria of the intestinal absorptive cells of the germfree rat* (abstract). Federation Proc. 25: 321.

The intestinal mucosa of seven germfree and seven conventionalized young adult male rats (Fischer strain, three months old) were examined by electron microscopy. Duodenal absorptive cells of germfree rats contained atypical forms of mitochondria. One type was round or elongated with one or more deep indentations. These often were wedge-shaped, and clearly bordered by the usual mitochondrial membrane. These indentations contained cytoplasmic ground substance consisting of very fine granular material. The mitochondrial membrane along the indentation, in some instances, was altered. The second form was mostly round to elongated. The outer mitochondrial membrane was well defined, but the inner matrix consisted of many irregular vesicular profiles, derived probably from dilated intracristal space. These vesicular cristae showed a short angular course. The atypical mitochondria were located just beneath the terminal web in absorptive cells around the tip of the villi. This unique localization and their morphologic variations might implicate some physiologic response to metabolic activity of germfree rat intestinal mucosa. - *Authors' summary modified.*

224. Rifaat, M. K. (Boston City Hospital, Boston, Massachusetts 02118), I. H. Rosenberg, and L. S. Gottlieb. 1966. *Development of fetal guinea pig small intestine: light and electron microscopic observations* (abstract). Federation Proc. 25: 456.

Sections of fetal guinea pig small bowel were studied from the 30th day of gestation to term (65-67 days). By light microscopy, villous and crypt epithelia were distinguishable at 34 days. A thin, irregular PAS staining of the brush border area was detected at 30-34 days and became better defined during gestation. Goblet and Paneth's cells appeared by 40 days. By electron microscopy there was a striking morphologic maturation of the epithelial cells. At 30 days the cytoplasmic organelles were not well developed and were located in a peripheral rim around a central mass of glycogen. By 60 days there was a marked diminution in glycogen and the organelles, now including cisternae of ribosomal endoplasmic reticulum and well developed Golgi, were distributed normally throughout the cytoplasm. The brush border at 30 days was formed by sparse, irregular microvilli measuring 0.2-0.7 μ in height. In contrast, from 60 days to term, the brush border was better developed with regular, well-spaced microvilli, 0.8-1.0 μ in height. The extraneous coat did not change in thickness, measuring 0.2-0.6 μ in height throughout the gestational period. - *Authors' summary.*

225. Patrizi, G. (Institute of General Pathology, University of Perugia, Perugia, Italy) and B. L. Munger. 1966. *The ultrastructure and innervation of rat vibrissae*. J. Comp. Neurol. 126: 423-436.

The innervation of rat vibrissae has been studied by light and electron microscopy. Nerve fibers enter the external root sheath and become associated with Merkel cells. Merkel cells are specialized sheath cells containing many secretory granules apposed to the neurite. These secretory granules are PAS-positive and diastase-resistant in light microscopic preparations. The neurite at the level of the Merkel cell is expanded and contains masses of mitochondria. As contrasted to nerve fibers in glabrous skin, the neurite does not penetrate deeply into the external root sheath but appears to terminate at the level of the Merkel cells. The neurite-Merkel cell complex is interpreted as representing a mechanoreceptor. - *Authors' summary*.

226. Shapiro, S.H. (Jewish Chronic Diseases Hospital, Brooklyn, New York 11203) and S. S. Lazarus. 1966. *Histochemistry and ultrastructure of pancreatic B cells in neonatal rabbits* (abstract). Federation Proc. 25: 535.

Pancreas from 28 rabbit litters aged 12 hours to 15 days were studied. Initially small islets containing cells with aldehyde fuchsin (AF) positive cell borders were noted. As time progressed islets enlarged and increasing numbers of cells showed variable degrees of AF staining of the cell cytoplasm. Enzymes studied included acid phosphatase, glucose-6-phosphatase, nucleoside diphosphatase at pH 9.2, NAD and NADPH₂ diaphorase. All were present at birth and showed similar cellular localizations as in the adult. Ultramicroscopically, at 12 hours, the B cells contained rare secretory vacuoles with central electron dense granules (ED) and somewhat larger numbers of smooth vacuoles with amorphous content of low electron density (ET). Both types of vacuoles gradually increased in number, but ET vacuoles markedly predominated and frequently were aligned at plasma membranes. The similar distribution of phosphatases and diaphorase at birth as in adults indicates that they are not critical for induction of secretory granule production. The morphologic findings suggest that both ET and ED vacuoles participate in the insulin secretory mechanism. - *Authors' summary*.

227. Dekker, A. (University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania 15213). 1966. *Fine structure and distribution of Syrian hamster pituitary basophils* (abstract). Federation Proc. 25: 535.

Electron microscopic fields from anterior, middle, and posterior portions of the pituitary gland were systematically photographed, and cell types counted and tabulated. Hyperplasia and hypertrophy of the appropriate basophils were observed in response to gonadectomy and thyroidectomy. Follicle-stimulating hormone cells are oval, adjacent to capillaries, have vesiculated endoplasmic reticulum, and contain secretory granules measuring approximately 200 m μ . This is the most frequent cell type in the male. Interstitial-cell-stimulating-hormone cells have filigreed cytoplasm, indistinct cell borders, and secretory granules measuring approximately 200 m μ . Thyroid-stimulating-hormone cells are angular and contain secretory granules measuring approximately 100 m μ . Thyroid-stimulating-hormone cells

are least numerous in both sexes. The three basophilic cell types are randomly distributed throughout the gland without any obvious localization.
- Author's summary modified.

228. Shorter, R. G. (Mayo Clinic, Rochester, Minnesota), J. L. Titus, and M. B. Divertie. 1966. *Cytodynamics in the respiratory tract of the rat*. Thorax 21: 32-37.

The cytodynamics of cells in the respiratory tract have been studied in normal adult Sprague-Dawley rats after the parenteral injection of tritium-labelled thymidine combined with autoradiography. The findings in the epithelia of the trachea and large bronchi showed an apparent migration time of labelled cells of six to seven and seven to eight days, respectively. Nuclear labelling in the epithelial cells of the small bronchi persisted for five to six days. The results indicate that two populations of alveolar macrophages exist, one with a life span of seven days and the other two to three weeks. The phase of synthesis of deoxyribonucleic acid (S phase) for the tracheo-bronchial epithelial cells and alveolar macrophages was eight hours. The classification of the cell populations into "renewing cell populations" was discussed. Differences in labeling were seen in bronchi showing purulent bronchitis. - Authors' summary.

229. Imondi, A. R. (University of Maine, Orono, Maine 04473) and F. H. Bird. 1966. *The turnover of intestinal epithelium in the chick*. Poultry Sci. 45: 142-147.

A microradioautographic technique employing tritiated thymidine was used to follow the migration of intestinal epithelial cells from the crypts of Lieberkuhn to the extrusion zone of the villi. It was found that the mucosa of the chick's jejunum was replaced in approximately 48 hours. The epithelium in the ileum was replaced faster than in the duodenum, but in both regions it took longer than 48 hours. It was concluded that the replacement of the intestinal epithelium of the chick is similar to that in mammals. - Authors' summary.

230. Cornelison, R. L., Jr. (University of Oklahoma Medical Center, Oklahoma City, Oklahoma 73106) and A. K. Weiss. 1966. *Bone electrolyte changes with aging in the rat* (abstract). Federation Proc. 25: 577.

A study was made of the Na, K, and Ca contents of rat bones during aging. Femurs were examined from Holtzman rats of both sexes, ranging in age from three weeks to between two and three years. The body-weight to femur-weight ratio is highest in the youngest group and declines until an adult level is reached (at approximately 12 weeks of age). The Na content of the femur remains unaltered during life (207-286 mEq/kg dry wt). The K content declines rapidly during the prematuration growth phase (from 175 to 25 mEq/kg dry wt), but remains unaltered thereafter. The Ca content increases during the growth phase (from 6,780 to 12,230 mEq/kg dry wt) and then remains relatively constant. The greatest alterations in the bone content of electrolytes occur early in life; thereafter only smaller changes can be observed. The calci-

fication occurring in some soft tissues in later life can be accounted for by the removal of relatively small quantities of Ca from the mineral matrix of the bone. - *Authors' summary modified.*

231. Mushin, Rose (University of Melbourne, Melbourne, Australia) and R. J. Dubos. 1966. *Coliform bacteria in the intestine of mice*. J. Exptl. Med. 123: 657-663.

Mice of the NCS and NCS-D colonies, bred at the Rockefeller University, harbored in their intestine an endemic strain of slow lactose-fermenting *Escherichia coli* 081±: :H21 serotype. In addition, NCS mice have recently acquired *E. coli* 0109±:K48:H14. Both strains persisted during the period of observation, whereas they were not encountered in the feces of mice from two other colonies. Other coliform strains encountered were more transient in their occurrence. Since strains of *E. coli* 081±: :H21 and 0109±:K48:H14 are extremely uncommon in human beings, it seems probable that they possess specificity for the mouse host. - *Authors' summary.*

232. Kalter, S. S. (Southwest Foundation for Research and Education, San Antonio, Texas 78206), R. E. Kuntz, Y. Al-Doory, and A. A. Katzberg. 1966. *Collection of biomedical study materials from baboons in East Africa: preliminary report*. Lab. Animal Care 16: 161-177.

An effort was made to determine the microbial and parasitic flora and fauna of the baboon. In order to differentiate organisms found in animals already in captivity from those that may be associated with the animal as it exists in its natural habitat, a study was made of newly-trapped animals under various geographic and ecologic situations in East Africa. This report concerns itself with various aspects of the field trip, defining the conditions under which the animals were captured and samples collected. Preliminary evidence as to what bacteria, fungi, parasites and viruses have been encountered in these animals is presented. This information will be eventually collated with that obtained from animals maintained under various "domestic" conditions. - *Authors' summary.*

233. Abrams, G. D. (University of Michigan, Ann Arbor, Michigan 48104), J. D. Mull, and Jane E. Bishop. 1966. *Normal flora and acute inflammation*. Nature 210: 1072-1073.

The effect of the normal flora on the mobilization of leucocytes and on the increase in vascular permeability to protein was assessed. This was accomplished by comparing the peritoneal inflammatory reaction elicited by a sterile starch-tryptose irritant in mice harboring a normal microbial flora with that elicited in mice having no demonstrable flora (germfree mice). The mean amounts of protein extravasated into the peritoneal cavity in the two groups of animals were approximately the same at each of the intervals tested. Thus, it was concluded that exudation of protein is not impaired in the absence of a normal microbial flora. This stands in sharp contrast to the fact that exudation of leucocytes was found to be markedly deficient in germfree animals. At the peak of the inflammatory process, almost twice as many leucocytes had been mobilized into the area of injury in conventional as compared to germfree mice, this difference being

independent of any difference in the availability of leucocytes from the circulating blood in the two groups of animals. It would appear that factors accounting for emigration of leucocytes are sharply influenced by the presence or absence of the flora, while the mediators of increase in vascular permeability to protein are not. - R. J. Flynn.

234. Abrams, G. D. (University of Michigan, Ann Arbor, Michigan 48104) and Jane E. Bishop. 1966. *Effect of microbial flora on resistance of small intestine to infection*. Federation Proc. 25: 456.

The normal flora significantly influences intestinal mucosal structure. This suggests that it might also influence mucosal resistance to invasion by enteric pathogens. To assess this possibility, germfree and conventional mice were infected with *Salmonella typhimurium*, and intraluminal growth of organisms in intestine, and translocation to mesenteric lymph nodes were studied quantitatively. One day after gastric challenge, germfree mice had far more organisms in their mesenteric nodes than did conventional mice. This was paralleled by greater intraluminal growth in germfree animals, so that no conclusion could be drawn about mucosal resistance. When the variable of gastric emptying was eliminated by duodenal challenge, similar results were obtained. However, when the variable of intestinal emptying was eliminated by ileal ligation before challenge, both intraluminal growth and translocation of *S. typhimurium* were equal in the two groups of mice. It is concluded that the normal flora does not influence mucosal resistance directly, but may alter enteric infection by affecting intestinal emptying.
- Authors' summary.

235. Gilbey, J. G. (University of Notre Dame, Notre Dame, Indiana 46556) and M. Pollard. 1966. *Search for Mycoplasma (PPLO) in "germfree" leukemic mice* (abstract). Federation Proc. 25: 292.

Specimens of thymus, lung, liver, spleen and bone marrow were removed aseptically from 47 germfree leukemic, 27 conventional leukemic and 30 conventional "disease-free" mice of AK, Swiss Webster, and BALB/c strains. The leukemia in the AK strain was spontaneous. In the latter two strains it was radiation-induced. The tissues were incubated in PPLO broth under aerobic and anaerobic conditions at 37 C. After three days' and six days' incubation, the samples were inoculated onto PPLO agar and incubated aerobically and anaerobically, at 37 C. They were examined at weekly intervals over a period of one month. *Mycoplasma* was not detected in the tissues of 47 germfree leukemic mice; however, *Mycoplasma* was isolated from the tissues of two conventional leukemic mice and from seven of the conventional "disease-free" mice. - Authors' summary modified.

236. Ducluzeau, R. (Station Centrale de Recherches Laitières et de Technologie des Produits Animaux, I.N.R.A. Jouy-en-Josas, Yvelines, France), P. Raibaud, Anne B. Dickinson, E. Sacquet, and G. Mocquot. 1966. *Hydrolyse de l'urée in vitro et in vivo, dans le caecum de rats gnotobiotiques, par différentes souches bactériennes isolées du tube digestif de rats conventionnels* (Hydrolysis of urea in vitro and in vivo in the cecum of gnotobiotic rats by different strains of bacteria isolated from the digestive tract of conventional rats). *Compt. Rend.* 262: 944-947.

Bacterial strains that belong to the genera *Lactobacillus*, *Actinobacillus* and *Staphylococcus* hydrolyze urea *in vivo* when they develop in the digestive tract of gnotobiotic rats. Other bacteria that belong to the genus *Lactobacillus* and *Proteus* hydrolyze urea *in vitro* when they grow in a culture medium containing urea, but not *in vivo*. The urealytic lactobacillus strains belong to the species *L. salivarius* and *L. fermenti*, but all the strains which belong to these two species are not urealytic either *in vivo* or *in vitro*. - Authors' summary.

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237. Malinow, M. R. (Oregon Regional Primate Research Center, Beaverton, Oregon 97005) and R. Wagner. 1966. *Oxygen uptake in squirrel monkeys* (*Saimiri sciurea*). *Lab. Animal Care* 16: 105-108.

The oxygen uptake observed in 11 male resting squirrel monkeys (*Saimiri sciurea*) is slightly over 800 ml O₂/kg/hr which corresponds to a daily intake of approximately 95 kcal/kg/24 hr or 91 kcal/kg^{3/4}/day. These values are comparable to 70 kcal/kg^{3/4}/day obtained independently in the basal state in homoiothermic mammals. - Authors' summary modified.

238. Williams, M. W. (College of Pharmacy, University of Arizona, Tucson, Arizona 85721), C. S. Williams, and G. R. DeWitt. 1966. *Oxygen consumption of preweanling and weanling mice*. *Life Sci.* 5: 541-543.

Absolute oxygen consumption of preweanling and weanling Swiss Webster mice up to 39 days of age reveals a profound depression at the age of ten days to about 2.25 ml/g/hr. Following this trough, a gradual rise occurs to about 5.4 ml/g/hr on the 25th day which is followed by a gradual fall to about 4.4 ml/g/hr at 39 days. - Authors' summary.

239. Lagerspetz, K. Y. H. (University of Turku, Turku, Finland). 1966. *Temperature relations of oxygen consumption and motor activity in newborn mice*. *Ann. Med. Exptl. Biol. Fenniae* 44: 71-73.

The increase of oxygen consumption which occurs when the ambient temperature is decreased from 34 C to 27-31 C in mice aged from one to seven days is probably for the most part caused by the parallel increase in the motor activity of the animals. The minimum of the oxygen consumption as well as of the motor activity appears at ambient temperature of 34-35 C. The motor responses to temperature resemble those designated as the orthokinetic orientation mechanism in poikilotherms. The significance of the occurrence of this behavioral mechanism of thermoregulation in young

mammals is discussed from the standpoint of the evolution and the postnatal development of homoiothermy. - *Author's summary.*

240. Miller, W. L. (Upjohn Company, Kalamazoo, Michigan 49003), J. J. Krake, and R. E. Solomon. 1966. *Respiratory quotient of albino rats: seasonal variation* (abstract). *Federation Proc.* 25: 719.

Measurement of the gaseous respiratory quotient (RQ) of male albino rats has indicated a seasonal variation. Rats were given food and water *ad libitum* and housed in individual cages, in temperature and humidity controlled rooms, with automatically controlled artificial "light periods" of 12 hr/day (6:00 AM-6:00 PM). In addition, rats were prepared with an indwelling venous cannula, 5-10 days before use, so that oxidation rates of infused C¹⁴-1-palmitic acid (FA) could be obtained simultaneously with RQ. Test animals remained in a glass metabolic chamber from about 9:00 AM to 3:00 PM; after two hours of equilibrium infusion, O₂ consumption and expired CO₂-C¹⁴O₂ were continuously measured. Different rats of equivalent weights were used throughout the study. During April-May, rats had lowest 11:00 AM RQ values ($.76 \pm .02$) and highest FA oxidation; in September-October period, RQ was intermediate ($.86 \pm .02$). In November-December period, RQ was highest ($.96 \pm .02$) and FA oxidation lowest. - *Authors' summary modified.*

241. Levenson, S. M. (Albert Einstein College of Medicine, Bronx, New York 10461), D. Kan, M. Lev, and F. S. Doft. 1966. *Oxygen consumption, carbon dioxide production and body temperature in germfree rats* (abstract). *Federation Proc.* 25: 482.

The O₂ consumption, CO₂ production and rectal temperatures of littermate germfree and conventionalized Fischer rats were measured 16-20 hr after food deprivation. The O₂ consumption and CO₂ production by the germfree rats were significantly lower. The rectal temperatures of the germfree rats were also significantly lower than those of the conventionalized rats in most experiments. Germfree rats purposely monocontaminated with *E. coli* showed prompt increases in oxygen consumption and CO₂ production but not in rectal temperature while those fed heat-killed *E. coli* or monocontaminated with *C. welchii* or *Bacteroides* showed no increase in metabolic rate or body temperature. Neomycin fed to *E. coli* monocontaminants decreased both the number of *E. coli* in the gut and the rats' O₂ consumption and CO₂ production. It is concluded that certain intestinal microorganisms increase, directly or indirectly, the O₂ consumption, CO₂ production and rectal temperatures of rats. - *Authors' summary modified.*

242. Patnaik, B. K. (Banaras Hindu University, Varanasi 5, India) and M. S. Kanungo. 1966. *Metabolic changes in the skin of rats of various ages: oxygen consumption and uptake of glucose.* *Biochem. J.* 98: 374-377.

Parallel determinations of the oxygen consumption by skin slices with glucose or galactose as substrate and of the concentration of DNA of the skin of various ages of rats were carried out to study the metabolic changes of the skin with age. Both the oxygen consumption and the DNA content of the skin decreased rapidly until the attainment of maturity; thereafter the rate of

decrease in oxygen consumption was lower whereas the concentration of DNA was constant. The decrease in the oxygen consumption during the early developmental period is thus due to the loss of cells, but the decrease in the older rats may be due to a decline in the activity of the cells of the skin as a result of aging. The uptake of glucose by the skin decreased with increasing age. - *Authors' summary.*

243. Gadsden, R. H. (Medical College of South Carolina, Charleston, South Carolina 29404), F. W. Kinard, K. B. H. Risinger, and M. G. Hay. 1966. *Methanol in dog breath* (abstract). *Federation Proc.* 25: 566.

Condensate from the expired air of ten dogs, or from the air of the room in which the animals were housed, contained acetone, methanol, ethanol and isopropanol. When these same animals were transferred to quarters outside the city, and were kept in kennels in the open air, the expired air was free of ethanol and isopropanol and contained acetone and methanol in a concentration equivalent to 36.1×10^{-6} and 27.6×10^{-6} mg/l, respectively. Condensate from the environmental air was free of the four compounds. Starving the dogs for six days resulted in increased acetone and decreased methanol in the expired air. It is concluded that methanol is present in the expired air of normal dogs. - *Authors' summary modified.*

244. Eayrs, J. T. (Maudsley Hospital, London, S.E. 5, England) and E. D. Williams. 1966. *Diet and strain of animal as factors regulating thyroid activity.* *J. Endocrinol.* 34: 277-278.

The authors report on studies in rats comparing strain and dietary influence on thyroid activity. Five sources of rats and two diets, purported to be the same but made by different manufacturers, were used. The factors measured were relative concentrations of radioactive iodide in the thyroid gland and the serum, growth during experiment, pituitary weight, thyroid weight, and thyroid cell height. Significant differences were demonstrated as a result of both strain and dietary factors. - *C. M. Poole.*

245. Grodums, E. I. (University of Saskatchewan, Saskatoon Saskatchewan, Canada), W. A. Spencer, and G. Dempster. 1966. *The hibernation cycle and related changes in the brown fat tissue of Citellus lateralis.* *J. Cellular Physiol.* 67: 421-430.

The hibernating habits of *Citellus lateralis* under standard laboratory conditions are described. Also described are the changes in morphology and composition of the brown fat tissues during hibernation and arousal. - *R. J. Flynn.*

246. Lyman, C. P. (Harvard University, Cambridge, Massachusetts 02138) and W. A. Wimsatt. 1966. *Temperature regulation in the vampire bat, Desmodus rotundus.* *Physiol. Zool.* 39: 101-109.

Body temperature and oxygen consumption were measured at various environmental temperatures in a series of captive and wild-caught vampire bats, *Desmodus rotundus*. The response to changes in ambient temperatures was unpredictable and could not be correlated with the age or sex of the animals, their nutritional condition, or the length of their captivity. Body

temperature varied greatly, but generally did not fall below 30 C when the ambient temperature was above 25 C. At lower ambient temperatures, some bats increased their metabolism and maintained a high body temperature for varying periods, while others showed little or no increase in metabolic rate, and their body temperatures declined. Below about 20 C body temperature, bats were unable to rewarm themselves without exogenous heat. Ambient temperatures of 33 C or more could be tolerated for only short periods. It is suggested that *Desmodus* is limited in its geographic range because of its inferior temperature regulation. - Authors' summary modified.

247. Reite, Ola B. (Ullevaal Hospital, Oslo, Norway) and W. H. Davis. 1966. *Thermoregulation in bats exposed to low ambient temperatures*. Proc. Soc. Exptl. Biol. Med. 121: 1212-1215.

Heart rates and rectal temperatures were recorded from inactive bats (*Myotis lucifugus* and *Lasiurus borealis*) exposed to stepwise changes in ambient temperature in the range between -5 C and 10 C. An increase in heart rate and in the difference between rectal and ambient temperature with decreasing ambient temperature below 5 C was found. The bats remained in the dormant state but were able to arouse from dormancy in response to mechanical stimuli. The results indicate that the species of bats studied possess thermoregulatory ability during dormancy and that this ability is a homeostatic mechanism and thus different from the process of arousal. - Authors' summary modified.

248. Nowell, N. W. (University of Hull, Kingston on Hull, England) and R. J. Howland. 1966. *The control of blood sugar in the laboratory rat and golden hamster: I. Intravenous glucose tolerance and insulin sensitivity tests*. Acta Endocrinol. 52: 149-153.

Some aspects of carbohydrate metabolism in the Wistar albino rat (*Rattus norvegicus*) and the golden hamster (*Mesocricetus auratus*) which had been kept in the laboratory at 21 C have been compared. Control blood sugar assays and intravenous glucose tolerance and insulin sensitivity tests were performed. The hamster was shown to have higher fasting and fed blood sugar levels than the rat; it responded equally well to insulin, but showed a comparatively very poor tolerance to exogenous glucose. It is concluded that the hamster maintains a relatively much smaller supply of insulin than the rat. - Authors' summary.

249. Bodanszky, M. (Squibb Institute for Medical Research, New Brunswick, New Jersey) and S. L. Engel. 1966. *Oxytocin and the life-span of male rats*. Nature 201: 751.

Investigations using subcutaneous injections of oxytocin in male rats demonstrated a life-prolonging effect after chronic administration. A significant difference in the number of surviving rats in the treated groups over the controls was not observed until after almost a year of triweekly injections. This work confirms the findings of others using posterior pituitary extract. At the same time it implicates oxytocin in a role, as yet undisclosed, vital to the life processes. - R. W. Camden.

250. Reddy, B. S. (University of Notre Dame, Notre Dame, Indiana 46556) and B. S. Wostmann. 1966. *Intestinal disaccharidase activities in the growing germfree and conventional rats*. Arch. Biochem. Biophys. 113: 609-616.

Disaccharidase (maltase, invertase, trehalase, lactase, and cellobiase) activities have been studied in homogenates of small intestine of the germfree and conventional rats from birth through 120 days of age. The pH optimum values for germfree and conventional rats were comparable. In adult germfree rats, the pattern of distribution of disaccharidase activities in different sections of small intestine was similar to that of conventional rats. Lactase and cellobiase activities were substantial at birth, reached maximum at seven days of age, and then decreased gradually to a plateau at 30 days of age in both groups. Maltase activity was low at birth, whereas no invertase and trehalase activities could be detected up to seven days of age, and these activities developed rapidly during the third week of life in both groups. Differences in activity of these disaccharidases between germfree and conventional rats were not apparent until after weaning (21 days) when the germfree animal showed a higher activity than the conventional rat. When the germfree rats were conventionalized by the introduction of cecal contents from the conventional rats, the disaccharidase activities were reduced to normal conventional levels. These results indicate that intestinal disaccharidases are synthesized by the animal itself, and that the intestinal microorganisms do not contribute to any major extent to their production. - *Authors' summary*.

251. Strandberg, K. (Karolinska Institutet, Stockholm, Sweden), G. Sedvall, T. Midtvedt, and B. Gustafsson. 1966. *Effect of some biologically active amines on the cecum wall of germfree rats*. Proc. Soc. Exptl. Biol. Med. 121: 699-702.

The cecum wall of germfree and conventional rats was compared with respect to content of and sensitivity to biologically active amines. The concentration of noradrenaline, l-adrenaline, dopamine, serotonin, acetylcholine and histamine was found to be of the same order of magnitude in germfree and conventional rats. Strips of the cecal wall from conventional rats exhibited regular spontaneous muscle contractions whereas in germfree rats such an activity was never seen. The cecal wall of the germfree rats was generally less sensitive to acetylcholine, serotonin, l-adrenaline and histamine. This was most pronounced for acetylcholine. In both kinds of cecal wall, the type of response to the amines administered was similar except for serotonin. - *Authors' summary*.

252. Gulick, W. L. (Dartmouth College, Hanover, New Hampshire 03755) and H. Zwick. 1966. *Auditory sensitivity of the turtle*. Psychol. Record 16: 47-53.

Auditory sensitivity functions were obtained by electrophysiologic methods for the turtle, *Pseudemys scripta*, and these were compared to behavioral threshold data obtained under comparable stimulation conditions. The turtle can hear tones between 20 and 1000 cps with maximum sensitivity in the range from 200 to 700 cps. - *Authors' summary modified*.

253. Bosma, M. J. (University of Illinois, Urbana, Illinois 61801), T. Makinodan, and H. E. Walburg. 1966. *A comparative study of the immune potential of germfree and conventional mice* (abstract). Federation Proc. 25: 547.

The development of immunologic competence in germfree and conventional animals was assessed at the cellular level by using the *in vivo* culture method. Known numbers of spleen cells from mice of various ages together with the test antigen (sheep red blood cells) were cultured in heavily irradiated recipient mice. The primary antibody-forming potential of spleen cells, expressed in terms of the plateau hemagglutinating antibody titer, was almost identical for the germfree and conventional mice.

- Authors' summary modified.

254. Binaghi, R. A. (New York University School of Medicine, New York, New York 10016), H. F. Oettgen, and B. Benacerraf. 1966. *Anaphylactic antibody in the young rat*. Intern. Arch. Allergy Appl. Immunol. 29: 105-111.

Young rats, two to three weeks of age, produced serum concentrations of anaphylactic antibody comparable to those found in the sera of adult animals. In contrast, the production of total precipitating antibody was much lower in young rats. Passage of anaphylactic antibody from the maternal to the fetal circulation could not be detected with the method employed. Trans-mission of anaphylactic antibody to the suckling babies was readily accomplished in the first two weeks of life, indicating that this type of immunoglobulin is present in high concentration in the milk and is easily absorbed from the intestinal tract of the babies. Newborn rats could not be passively sensitized with rat anaphylactic antibody. The ability to become passively sensitized was gradually established with progressing age. - Authors' summary.

255. Parish, W. E. (Lister Institute, Chelsea Bridge Road, London, S. W. 1., England), G. A. Gresham, A. N. Howard, and R. R. A. Coombs. 1966. *Anaphylaxis in the baboon* (*Papio cynocephalus*). Intern. Arch. Allergy Appl. Immunol. 29: 36-51.

Fatal anaphylaxis followed intravenous challenge in three of four baboons sensitized to cow's milk. The immediate signs were vomiting, defecation and circulatory collapse. Death, which followed $2\frac{1}{2}$ -8 hr after challenge, appeared to be caused by generalized anoxia arising from the circulatory collapse. The intestine and liver were the organs most severely affected, though it is possible that changes in the liver were secondary to the intestinal damage. On histological examination there was hemorrhage and necrosis of the villi of the small intestine and extensive edema of the submucosa. The lungs were infiltrated by large numbers of leucocytes.

- Authors' summary.

CARDIOVASCULAR AND HEMATOLOGIC CHARACTERISTICS

256. Ferber, R. (Peter Bent Brigham Hospital, Boston, Massachusetts 02115), H. Evans, and E. Amador. 1966. *The renal veins of the dog*. J. Urol. 95: 318-322.

In the dog the pattern of the renal arteries differs significantly from that of the renal veins. The main renal artery divides into an anterior and a posterior branch, each of which divides into six to eight interlobar arteries. Occasionally, a small artery also arises from or near the bifurcation of the renal artery. Dual main arteries occur rarely. Also, a number of transcapsular arteries are usually present although they are very thin. The lobar arteries are end arteries, dividing the kidney symmetrically into 12 to 16 noncommunicating segments. The only collateral arterial circulation is found in the capsule, or as part of the transcapsular arteries. In contrast, the main renal vein divides the kidney in a superior-inferior fashion. Also, one or two middle branches are always present. Dual main renal veins or anomalous renal veins are not observed. Abundant anastomoses via the arcuate veins interconnect all of the kidney. Thus, whereas the arteries show an almost perfect anteroposterior symmetry, the veins show a general superior-inferior symmetry; and, whereas there is no intrarenal collateral arterial circulation, extensive veno-venous anastomotic circulation is the rule. - R. J. Flynn.

257. Heisey, S. R. (Harvard Medical School, Boston, Massachusetts 02115). 1966. *Brain blood volumes of various vertebrates* (abstract). Federation Proc. 25: 704.

Brain blood volumes were measured in representative species of each vertebrate class. Volumes in the rat, pigeon, turtle, frog and goldfish were: 18, 24, 32, 37 and 35 μ l/g brain, respectively. Experiments with two different sizes of goldfish showed that brain blood volume per gram of brain was smaller in the larger brains. This is similar to the decrease in blood volume per gram of brain that accompanies maturation in mammalian brains. The blood volume of the lateral and fourth ventricular choroid plexuses of the turtle was 20% of the total volume. Brain blood volume in lower vertebrates is slightly greater than in mammals but proportionally more blood is contained in the large choroid plexuses of the lower classes. - Author's summary modified.

258. Crawley, G. J. (Mukwonago, Wisconsin 53149) and M. J. Swenson. 1966. *The canine electrocardiogram: prior to and following production of cardiac lesions*. Vet. Med. 61: 363-372.

Electrocardiograms (ECG) from normal dogs prior to production of cardiac lesions revealed (1) Q-waves in lead I were followed by negative T-waves in 95% of recordings; (2) S-waves in lead III were followed by positive T-waves in 89%; (3) ST deviations (0.2 mV) occurred in 20% of dogs in one or more leads; (4) positive P-waves in leads II, III and aVF; (5) complete absence of ventricular extrasystoles; (6) considerable variability in various complexes among dogs and within dogs daily. Changes seen most frequently following induced cardiac lesions were (1) ventricular extrasystoles; (2) negative P-waves in leads II, III and aVF; (3) ST

deviations ± 0.2 mV or more in one or more leads; (4) Q-waves in lead I followed by a positive T-wave; (5) S-waves in lead III followed by a negative T-wave; (6) decreased R/S and/or R/T ratios. No correlation could be made between ECG changes following lesions and the amount of tissue necrosis or rise in blood serum enzymes. - *Authors' summary.*

259. Phelan, E. L. (University of Otago Medical School, Dunedin, New Zealand). 1966. *Cardiovascular reactivity in rats with spontaneous inherited hypertension and constricted renal artery hypertension.* Am. Heart. J. 71: 50-57.

The cardiovascular responses to pressor drugs and ganglion blockade were examined in rats with spontaneous inherited hypertension and rats with renal hypertension. Similarities and differences in the reactions of the two types of rats were observed. The differences, with other evidence, indicate that the pathogenesis of spontaneous inherited hypertension differs from that of chronic renal hypertension. - *Author's summary modified.*

260. Burns, K. F. (Tulane University School of Medicine, New Orleans, Louisiana 70112) and C. W. De Lannoy, Jr. 1966. *Compendium of normal blood values of laboratory animals, with indication of variations.* 1. *Random-sexed populations of small animals.* Toxicol. Appl. Pharmacol. 8: 429-437.

Four hematologic values and 11 blood-chemical constituents were determined on five species of laboratory animals. Analysis was by ultramicro, micro, and automated techniques. The various techniques and instrumentation involved are described. Range, mean, standard deviation and coefficient of variation are given for each determination. - *D. V. Tolle.*

261. Thompson, R. B. (University of Mississippi, Jackson, Mississippi 39216), H. B. Hewett, S. S. Kilgore, A. P. Shepherd, and W. N. Bell. 1966. *Haemoglobin variants in a species of wild mice - Peromyscus maniculatus.* Nature 210: 1063-1064.

Hematologic studies including complete blood count, cell indices and hemoglobin electrophoresis are reported on two ecologically and geographically distinct groups of *Peromyscus maniculatus*, the white-footed deer mouse. Mice trapped at an elevation of 10,450 feet were shown to have a larger mean corpuscular volume and a greater mean corpuscular hemoglobin concentration but a lower total red cell count than mice trapped at an elevation of 7,500 feet. This relationship of cell size and altitude is the converse of what one might expect: that the red cell count would increase and the mean corpuscular volume decrease. Hemoglobin electrophoresis on each group revealed a faster migrating single band hemoglobin in the mice trapped at 7,500 feet. DEAE cellulose, Sephadex 40, chromatography with a mixture of both hemoglobins reaffirmed the starch gel electrophoretic findings and two separate components were identified. The authors suggest that natural selection has led to a more efficient type of hemoglobin making possible the selection of the larger cell size. - *D. V. Tolle.*

262. Bullard, R. W. (Indiana University, Bloomington, Indiana 47005), C. Broumand, and F. R. Meyer. 1966. *Blood characteristics and volume in two rodents native to high altitude*. J. Appl. Physiol. 21: 994-998.

Some characteristics associated with the blood of two rodents, the golden-mantled ground squirrel, *Citellus lateralis*, and the yellow-bellied marmot, *Marmota flaviventris*, native to high altitude (3,800 m), were determined and compared to those of laboratory rats born and raised at 3,800 and 280 m. Both native rodents showed lower hemoglobin concentrations, erythrocyte counts, and hematocrit ratios than did the acclimatized rats. Hemoglobin content per cell was the same in the three species but the erythrocytes were slightly larger in the species native to high altitude. The volume of plasma and calculated volume of red blood cells on a body-weight basis were larger in the marmot and squirrel, and these two species possessed hemoglobin dissociation curves far to the left of that of the acclimatized rats, indicating a greater oxygen affinity in the high altitude species. The findings agree with those of others - that many mammals native to high altitude do not possess polycythemia. The results indicate that this is because of a higher plasma volume. - *Authors' summary modified.*

263. Fiala, J. (Ústav hematologie a krevní transfuze, Prague 2, Czechoslovakia), L. Viktora, and J. Urbánková. 1966. *Osmotic resistance of leucocytes of some laboratory animals*. Physiol. Bohemoslov. 15: 281-284.

The osmotic resistance of leucocytes of several species of laboratory animals was tested after 30, 60, 120 and 180 minutes' exposure to hypotonic 0.2% sodium chloride solution and the results were compared with the values for the resistance of leucocytes of adult human subjects and newborn infants. Mouse leucocytes displayed the greatest resistance, followed, in descending order, by dog, rabbit, white rat and guinea pig leucocytes. The resistance of leucocytes of adult human subjects was lower than the values for mouse leucocytes and corresponded approximately to the values for dog leucocytes. The resistance of leucocytes of newborn infants was much lower than that of the leucocytes of adult human subjects. - *Authors' summary.*

264. Moor-Jankowski, J. (New York University Medical School, New York, New York 10016), A. S. Wiener, and J. Fineg. 1966. *Sero-primatology: a new discipline*. Lab. Primate Newsletter 5: 12-20.

Variations in blood-group distribution in chimpanzees and gibbons are reported. They are comparable to the extreme variations encountered in man, as in isolates of American Indians and of Australian aborigines. They are useful as a new taxonomic parameter and may help to explain the origin of polymorphism and the varying distribution of blood groups in man. - *R. J. Flynn.*

265. Moor-Jankowski, J. (New York University School of Medicine, New York, New York 10016), A. S. Wiener, C. H. Kratochvil, and J. Fineg. 1966. *Seroprimatology of chimpanzees: blood-group distribution as a "racial" characteristic*. Science 152: 219-220.

Significant differences in the distribution of human-type and simian-type blood groups have been demonstrated in chimpanzees classified into subspecies or "races" on the basis of morphological traits. The differences in chimpanzees are analogous to racial differences in the distribution of blood groups in man. - *Authors' summary*.

266. Moor-Jankowski, J. (New York University School of Medicine, New York, New York 10016), A. S. Wiener, H. Kratochvil, and J. Fineg. 1966. *Chimpanzee blood groups: demonstrated with isoimmune and cross immune sera*. Intern. Arch. Allergy Appl. Immunol. 29: 397-403.

Two simian-type erythrocyte blood factors of chimpanzees, G^C and H^C , are described. The serological characteristics and the population analysis of these and of the other six recently described blood group specificities are presented. They show the existence in chimpanzees of the simian-type blood group systems, V-A-B, C-E-F-H, and a system for the factor G^C . - *Authors' summary modified*.

267. St. Clair, R. W. (Bowman Gray School of Medicine, Winston-Salem, North Carolina 27103), C. C. Middleton, T. B. Clarkson, and H. B. Lofland. 1966. *Serum lipids, lipoproteins and atherosclerosis in New World primates* (abstract). Federation Proc. 25: 388.

Results of a recent field survey of atherosclerosis in six species of South American monkeys (333 animals) indicate major differences in levels of serum cholesterol, lipoprotein distributions, and in susceptibility to atherosclerosis. Mean serum cholesterol values and cholesterol distribution between α and β lipoprotein for the various species were: *Saimiri sciureus* (squirrel monkey), 105 mg%, 29 α , 71 β ; *Cebus albifrons* (ringtail monkey), 90 mg%, 24 α , 76 β ; *Cebus apella* (Capuchin monkey), 98 mg%, 26 α , 75 β ; *Ateles* sp. (spider monkey), 130 mg%, 10 α , 90 β ; *Lagothrix* sp. (woolly monkey), 133 mg%, 10 α , 90 β ; *Saguinus nigricollis* (white-lipped marmoset), 69 mg%, 27 α , 73 β . The animals could be ranked, in order of decreasing susceptibility to atherosclerosis as follows: squirrel>spider>ringtail>Capuchin>woolly>marmoset. - *Authors' summary modified*.

268. Leone, C. A. (University of Kansas, Lawrence, Kansas 66044) and R. L. Anthony. 1966. *Serum esterases among registered breeds of dogs as revealed by immunoelectrophoretic comparisons*. Comp. Biochem. Physiol. 18: 359-368.

Aromatic esterase and cholinesterases in the sera of 110 dogs representing 40 breeds were identified by specific enzyme characterization tests conducted on immunoelectrophoresis slides. The serum from each breed was tested against antisera prepared, in rabbits, against ten of the breeds. All breeds were placed in hierarchies in terms of their correlations for enzyme activity with one another. In the aromatic esterase tests, 64% of

the breeds had the highest amount of correlation with breeds in their own genealogic line. For the cholinesterase tests, the value was 67.5%. When statistical tests for congruency between the aromatic esterase and cholinesterase data were performed, the correlation coefficient between the two sets of results was found to be 0.230. On the basis of this low correlation, the two enzyme systems are assumed to be independent of one another and to be controlled by different gene systems. - *Authors' summary modified.*

269. Wagner, M. (Institut für Mikrobiologie und experimentelle Therapie, Jena, German Democratic Republic) and H. Heinecke. 1966. *Serologische Kreuzreaktionen des Hämoglobins der Hausmaus (Serological cross reactions of the hemoglobin of the house mouse)*. Z. Immunitätsforsch. Allergie Klin. Immunol. 130: 137-142.

Antibodies against the hemoglobin of the house mouse as well as against certain nonhemoglobin proteins of the hemolysate show crossreactions with hemolysates of some species of the Rodentia order, but not of other animals. The cross-reactions remain restricted to the suborder Myomorpha, with the hemoglobin showing a lower specificity than nonhemoglobin proteins. - *Authors' summary.*

270. Williams, J. S. (Walter Reed Army Medical Center, Washington, D. C. 20012), Frances C. Meroney, G. Hutt, and E. H. Sadun. 1966. *Serum chemical components in mice determined by the use of ultramicro techniques*. J. Appl. Physiol. 21: 1026-1030.

The mean and SD for amounts of serum constituents determined in 1,164 mice in groups of 30-120 animals were as follows: total proteins 6.2 ± 0.6 g/100 ml; phosphorus 9.2 ± 1.9 , calcium 9.1 ± 0.6 , creatinine 1.1 ± 0.2 , bilirubin (total) 0.43 ± 0.5 , bilirubin (direct) 0.14 ± 0.10 , and glucose 70 ± 15.8 mg/100 ml; alkaline phosphatase 4.4 ± 1.2 , serum glutamic pyruvic transaminase 23 ± 8.6 , and serum glutamic oxalacetic transaminase 73 ± 15.6 units/ml; protein components, albumin 3.4 ± 0.5 , globulins α_1 , 0.5 ± 0.2 , α_2 , 0.8 ± 0.2 , β , 1.5 ± 0.3 , and γ , 0.4 ± 0.1 g/100 ml; bromsulphalein retention 0.0-16.5%; sodium 149.8 ± 2.8 , chloride 112.1 ± 4.9 , potassium 5.4 ± 0.5 , and carbon dioxide 21.9 ± 3.4 mEq/liter; and cephalin flocculation 24 and 48 hr negative. These techniques were also successfully employed in the determination of intravenous glucose tolerance tests in mice. Significant differences were observed in different strains. These studies provide data necessary for a better utilization of the mouse as a test animal for physiologic, biochemical, and microbiologic investigations. - *Authors' summary.*

271. Denisov, V. P. (University of Saratov, Pedagogical College of Saratov, Saratov, U. S. S. R.) and I. A. Denisova. 1966. *Seasonal changes in the protein composition of the blood serum of some hibernating mammals* (in Russian). Zh. Obshch. Biol. 27: 324-330.

Seasonal changes of blood serum proteins of *Citellus pygmaeus* were studied electrophoretically on filter paper. The proteins of four groups of ground squirrels were investigated: spring (April-May), summer (June-

July), hibernating (October-November), and animals active in October-November. Statistical treatment of the experimental data revealed a close correlation between seasonal and sexual changes in proteins of the blood serum. Sexual dimorphism observed in the proteins may be distinctly expressed during one period of life, being absent during another. Changes in the ratio of protein serum fractions in relation to seasons are characteristic of both males and females of *C. pygmaeus*. Albumins, α and γ globulins undergo significant changes whereas the concentration of β globulins is more or less constant, being independent of the season. However, β_1 and β_2 globulins that compose the β -globulin fraction are subjected to considerable seasonal changes. - *Authors' summary*.

272. Reuter, A. (Centre d'Etude de l'Energie Nucléaire, Mol, Belgium) and F. Kennes. 1966. *Strain and sex dependency of pre-albumin in mice*. Nature 201: 745.

The composition of the prealbumin fraction in the serum of several strains of mice was determined using starch-gel electrophoresis. Three distinct components were separated which were labeled PA_1 , PA_2 and PA_3 by the authors. Electrophoretic patterns of female mice were shown to be significantly different from those of male mice. PA_1 was detectable only in male animals and PA_2 and PA_3 components were significantly lower in female mice. No significant differences were detected in electrophoretic patterns of immature, four-week old, males and females. - *D. V. Tolle*.

BEHAVIOR

273. Benton, A. H. (State University College, Fredonia, New York 14063). 1966. *Waltzing in the red-backed mouse*. J. Mammal. 47: 357.

Waltzing has been reported for several genera of rodents, but not for the genus *Clethrionomys*. In August, 1954, the author observed this condition in a red-backed mouse, *Clethrionomys gapperi*. One of a litter of five, a male, was a waltzer. In the cage he behaved normally, but whenever he was handled or disturbed in any way, he began the jerking and circling movements typical of this affliction. In every other respect his behavior, growth and development appeared normal. - *R. J. Flynn*.

274. Bovet, D. (School of Medicine, University of California, Los Angeles, California 90024), Filomena Bovet-Nitti, and A. Oliverio. 1966. *Short and long term memory in two inbred strains of mice*. Life Sci. 5: 415-420.

Conditioned avoidance behavior was studied in two strains of mice by using different training schedules. The strain C3H/He reached a higher performance when the trials were massed while DBA mice showed a better retention by distributing practice. The results are discussed on the basis of a dual mechanism of memory storage. - *Authors' summary*.

275. Lisenby, D. (Veterans Administration Hospital, Jefferson Barracks, St. Louis, Missouri 63125) and B. N. Premachandra. 1966. *Behavioral and physiological changes as a function of chronological age* (abstract). Federation Proc. 25: 577.

In a group of mature male guinea pigs ranging in age from 138 to 863 days, a significant decline in thyroid secretion was observed as a function of increasing chronological age. In the same group of animals maximum speed of performance, fatiguability and learning ability were also measured. In analyzing the results, chronological age and thyroid secretion rate were combined by means of multivariate correlational techniques to form a single predictable variable which is considered to be an index of biological age. This variable was then correlated with certain observed individual differences in behavior. - *Authors' summary modified.*

276. Noirot, Eliane, (Madingley, University of Cambridge, Cambridge, England) and M. P. M. Richards. 1966. *Maternal behaviour in virgin female golden hamsters: changes consequent upon initial contact with pups*. Animal Behaviour 14: 7-10.

Initial contact with pups of a certain age causes changes in virgin female hamsters' behavior with pups of another age. This was shown by comparing the behavior with five-day-old pups in groups of naive (control) animals and of animals given one previous contact either with one-, five- or nine-day-old pups. Maternal responses were more intense in the animals previously presented with one or nine-day-old pups than in the control animals. Attacking was increased after initial contact with one-day-old pups and decreased after initial contact with nine-day-old pups. Animals presented twice with the same pattern did not show marked changes in either of the two activities. - *Authors' summary.*

277. Moltz, H. (Brooklyn College, City University of New York, New York, New York), D. Robbins, and M. E. Parks. 1966. *Caesarean delivery and maternal behavior of primiparous and multiparous rats*. J. Comp. Physiol. Psychol. 61: 455-460.

The authors designed an experiment to determine if the preclusion of parturition through cesarean delivery would interfere with expressions of maternal behavior. If this were the case, they wanted to determine to what extent, if at all, this phenomenon might be mitigated by previous parity. Primiparous and multiparous rats were subjected to cesarean delivery shortly before term and presented with a litter of neonatal pups. The results indicate that the female rat can enter into an effective nurtural relationship despite having been deprived of the experience of parturition. Moreover, primiparous rats subjected to cesarean section were found to be as maternally competent as cesarean-sectioned multiparous rats. - *Authors' summary modified.*

REPRODUCTION, PRODUCTION

278. Hutchinson, T. C. (University of Florida School of Medicine, Gainesville, Florida 32603). 1966. *A method for determining expected parturition date of rhesus monkeys, (Macaca mulatta)*. Lab. Animal Care 16: 93-95.

A statistical and graphic method is presented for estimating expected date of parturition in rhesus monkeys. The method uses measurements of either the humerus or the femur taken on fetal radiographs. The method has proved, in two years of testing, to be especially applicable for determining time for cesarean section, for giving a good index of fetal growth, and for determining expected delivery date of the full term infant. - *Author's summary*.

279. Chipman, R. K. (University of Vermont, Burlington, Vermont 05401), J. A. Holt, and K. A. Fox. 1966. *Pregnancy failure in laboratory mice after multiple short-term exposure to strange males*. Nature 210: 653.

Previous experimenters have demonstrated an olfactorily-induced pregnancy failure in recently inseminated laboratory mice continually subjected to the presence of a strange male. The authors proposed to determine if multiple, short-term exposures of the newly inseminated female to strange males would reduce the pregnancy rate. The data obtained indicated no significant difference in degree of pregnancy failure from multiple short-term exposure as opposed to continuous exposure. The authors believe that multiple short-term exposures most closely approximate the degree of contact under natural conditions. - *R. W. Camden*.

280. Levine, L. (City College, City University of New York, New York, New York 10010), Gail E. Barsel, and Carol A. Diakow. 1966. *Mating behaviour of two inbred strains of mice*. Animal Behaviour 14: 1-6.

Observations were made of the mating patterns of males from two inbred strains, ST/J and CBA/J, with females from both of these strains. Experiment I involved single males that were housed separately, while experiment II involved inter-strain pairs of males that were housed together. In three out of the four possible situations, the ST males had a significantly greater rate of mating success than the CBA males. In all four situations the mating pattern of the ST male was significantly different from that of the CBA male in at least two respects (thrusts per mount and genital lickings per mating). It is not possible, at this time, to attribute the greater mating success of the ST male to any specific aspects of his mating pattern. The mating success of each of the two types of males, under paired conditions with ST females, in this experiment corresponds closely to the reproductive success of these males in a previous experiment. - *Authors' summary*.

281. Marston, J. H. (Medical School, University of Birmingham, Birmingham 15, England) and M. C. Chang. 1966. *The morphology and timing of fertilization and early cleavage in the Mongolian gerbil and deer mouse*. J. Embryol. Exptl. Morphol. 15: 169-192.

The timing of ovulation, penetration of spermatozoa, and cleavage was studied in naturally mated Mongolian gerbils maintained in a controlled environment. The timing of sperm penetration and cleavage was studied in deer mice following artificial insemination of mature and immature animals close to the time of gonadotrophin-induced ovulation. A few naturally-mated animals were also studied. The morphology of fertilization and cleavage in the Mongolian gerbil and deer mouse is described and illustrated. - *Authors' summary*.

282. Bhargava, K. P. (K. G. Medical College, Lucknow University, Lucknow 3, India) and M. L. Gupta. 1966. *A study of central adrenergic mechanisms in the regulation of the oestrous cycle of albino mice*. Brit. J. Pharmacol. 26: 601-605.

The effect of some agents influencing central adrenergic mechanisms has been studied on the duration of estrous cycle in albino mice. α -Methyl-metatyrosine and imipramine significantly prolonged the estrous cycle. The dopa decarboxylase inhibitor, α -methyldopa, and monoamine oxidase inhibitors had no effect on the estrous cycle. The effect of α -methylmetatyrosine on the estrous cycle could be completely inhibited by prior treatment of mice with the monoamine oxidase inhibitors tranlycypromine and pheniprazine. The results indicate that an adrenergic mechanism is involved in the release of neurohumoral transmitters regulating the estrous cycle in albino mice. - *Authors' summary*.

283. Dukelow, W. R. (University of Minnesota, Grand Rapids, Minnesota 55744). 1966. *Effects of age and strain of female, and of ethylene dichloride extracted wheat germ oil on reproduction in mink (Mustela vison)*. J. Reprod. Fertility. 11: 181-184.

One hundred and sixty female mink of four color strains (pearl, cameo, dawn pastel and violet) were assigned to eight groups according to age and color. One-half of each group received wheat germ oil extracted with ethylene dichloride, while control mink received corn oil supplemented with mixed tocopherols. Mean performance data for the control and treated groups respectively were as follows: days from first attempted mating until actual first mating, 3.0 and 2.1; conception rate, 66.3 and 60.0%; young born per pregnant female, 2.29 and 2.45; weight of young at three weeks of age, females 93.6 and 95.5g, and males 101.7 g and 105.1. Differences between control and treated groups were not statistically significant. Highly significant differences were observed between strains for conception rate, number of male and female young and total young per pregnant female. A significant interaction was noted between wheat germ oil treatment and strain in the number of days required to achieve mating. Previous reproductive history of the females (parous or nonparous) had little effect on the characteristics studies. - *Author's summary*.

284. Schultze, A. B. (University of Nebraska, Lincoln, Nebraska 68503). 1966. *Uterine metabolic status during pregnancy and litter size in rats*. J. Animal Sci. 25: 339-341.

Uterine metabolic status measured by determining triphenyltetrazolium chloride (TTC) reduction rate of the tissue in pregnant rats was studied in relation to litter size. Uterine TTC reaction at day four of pregnancy was related curvilinearly with litter size at term; average uterine metabolic levels were associated with larger litter size than were very low or very high levels. Uterine reaction determined at day eight was almost linearly associated with litter size: the lower the value, the larger the litter size. At day 12 of pregnancy, uterine TTC reaction rate was again curvilinearly related to litter size; average uterine TTC reaction levels were associated with larger litters, and both low and high values were associated with smaller litters. - *Author's summary*.

285. Martin, R. D. (Max-Planck-Institut für Verhaltensphysiologie, Seewiesen und Erling-Andechs, Germany Federal Republic). 1966. *Tree shrews: unique reproductive mechanism of systematic importance*. Science 152: 1402-1404.

Tupaia offspring are maintained in a separate nest constructed by the male parent and are suckled by the female only once every 48 hours. The young are nevertheless able to maintain a constant external body temperature of 37 C. Important taxonomic and behavioral aspects are presented. - *Author's summary modified*.

286. Michael, R. P. (Institute of Psychiatry, Bethlem Royal Hospital, Beckenham, Kent, England), J. Herbert, and G. Saayman. 1966. *Loss of ejaculation in male rhesus monkeys after administration of progesterone to their female partners*. Lancet 1(7445): 1015-1016.

An 18-month investigation of six pairs of oppositely-sexed, adult rhesus monkeys (426 tests) has shown that the sexual performance of the males depends upon the endocrine status of their female partners. In particular, the mounting activity and ejaculatory capacity of the males is notably diminished by the administration of progesterone to the females. - *Authors' summary*.

287. Layne, J. N. (Cornell University, Ithaca, New York 14850). 1966. *Postnatal development and growth of Peromyscus floridanus*. Growth 30: 23-45.

Data are given on morphological and behavioral development of the young, maternal behavior, and related aspects of the reproductive biology of a population of the Florida mouse, *Peromyscus floridanus*, occurring in dry pine-oak woodlands in north-central Florida. In the developmental condition of the neonate and general postnatal growth and developmental pattern, this species, which is placed in the monotypic subgenus *Podomys*, is more similar to members of the subgenus *Peromyscus* than to those of the subgenus *Haplomylomys*. Comparative data on growth and development are not available for species of the remaining four subgenera included in the genus. Compared to species of *Peromyscus* of equivalent body size, *P. floridanus*

has relatively large neonates, small litter size, and prolonged development. These features are interpreted as adaptations to xeric environments where food and water may be limited. Several adult behavioral characteristics observed which seem to reflect the underground nesting habits of the species include: 1) plugging of the nest box entrance when leaving, an activity perhaps more prevalent in females with young; 2) poor nest construction; and 3) an apparently lesser tendency for mothers to retrieve displaced young than in some species which typically nest in more accessible situations. - *Author's summary.*

288. Perry, J. S. (Institute of Animal Physiology, Babraham, Cambridge, England). 1966. *Reproductive wastage I. Pre-natal loss.* Lab. Animal Inform. Serv. Bull. 1966: 15-24.

The author discusses reproductive wastage in terms of prenatal loss or the ratio of the number of ova ovulated to the number of young born alive. Species discussed in detail are the rat, mouse, guinea pig, rabbit, cat and pig. Pertinent literature is reviewed with specific emphasis on the chronologic and etiologic aspects of prenatal losses. The author warns against accepting more than a small proportion of loss as inevitable. - *R. W. Camden.*

289. Rowlands, I. W. (Institute of Animal Physiology, Babraham, Cambridge, England). 1966. *Reproductive wastage II. Post-natal loss.* Lab. Animal Inform. Serv. Bull. 1966: 25-33.

The author discusses reproductive wastage in terms of postnatal losses, or those deaths occurring from birth to weaning. Losses at parturition are discussed in terms of improper lung expansion in the newborn, maternal neglect and dystocia. Neonatal mortality, or that occurring in the first few days of life, is the second type of loss. The author states that this type is probably rare in small rodents but has been observed as a problem in the ferret and canine. Maternal rejection of unknown cause may be part of the etiology as well as other factors as yet unrecognized. Losses later in the postnatal period may be due to failure of lactation. This is a complex phenomena influenced by diet, environment and hormonal balance. Other losses may be due to conditions of rearing. The author suggests the need for discovering optimal conditions for rearing laboratory animals. - *R. W. Camden.*

290. Kerr, G. R. (Wisconsin Regional Primate Research Center, University of Wisconsin, Madison, Wisconsin 53706) and H. A. Waisman. 1966. *The rearing of the infant rhesus monkey (Macaca mulatta).* Lab. Primate Newsletter 5: 1-8.

The problem of infant care is discussed from conception through fetal growth and postnatal development. The authors state that infant macaques will thrive under a wide variety of laboratory conditions if given reasonable care with regard to diet, housing facilities, health measures and prompt treatment of disease. They conclude that most of the problems encountered in raising macaques can be overcome by good common sense. - *E. F. Staffeldt.*

291. O'Grady, Diane (Royal Free Hospital School of Medicine, London, England) and Rosemary Clarke. 1966. *Some observations on a cat breeding unit.* J. Inst. Animal Tech. 17: 41-46.

The authors describe the facilities, equipment and methods that have been developed for the operation of a cat breeding unit in which over 100 stock cats are maintained and an average of 350 kittens are born annually. Sanitation, and breeding procedures, food preparation, diseases encountered and record keeping are all discussed. They conclude that, with careful supervision and the use of proper therapeutic agents, when indicated, a good breeding colony can be successfully maintained. - C. M. Poole.

SPECIFIC-PATHOGEN-FREE AND GERM-FREE TECHNOLOGY

292. Trentin, J. J. (Baylor University College of Medicine, Houston, Texas 77025), G. L. Van Hoosier, Jr., Jacqueline Shields, Kristina Stephens, and W. A. Stenback. 1966. *Establishment of a caesarean-derived, gnotobiotic foster nursed inbred mouse colony with observations on the control of Pseudomonas*. Lab. Animal Care 16: 109-118.

Nine strains of inbred mice (A, AKR, BALB/c, C57, CBA, C3H, C3HfG, DBA, and T6) were cesarean derived (CD), foster nursed on gnotobiotic mice (ND2 strain) and maintained within a room barrier system. The general health, virological status, and reproductive capacity of the CD strains were greatly improved. The significant morbidity and mortality among suckling and weanling mice of the conventional colony are conspicuously absent in the CD colony. Ectoparasites and endoparasites present in the conventional colony have not been found in the CD colony. The most difficult problem encountered has been the control and elimination of *Pseudomonas* organisms, which gained entry into the CD colony. This infection of the CD mice was eliminated largely by (a) control of all possible sources of entry of *Pseudomonas* into the barrier; (b) control of environmental sources of propagation within the barrier, including the sink, drain, and water faucet; (c) prevention of dissemination within the colony via the drinking water bottles - this was accomplished by acidification of the drinking water with HCl to pH 2.5; and (d) detection of carrier mice by bacterial culture of mouth swabs, and elimination of such mice from the colony. - *Authors' summary*.

293. Van Hoosier, G. L., Jr. (Baylor University College of Medicine, Houston, Texas 77025), J. J. Trentin, Jacqueline Shields, Kristina Stephens, W. A. Stenback, and J. C. Parker. 1966. *Effect of caesarean-derivation, gnotobiotic foster nursing and barrier maintenance of an inbred mouse colony on enzootic virus status*. Lab. Animal Care 16: 119-128.

Inbred mouse strains A, AKR, BALB/c, C57BL, CBA, C3H, C3HfGs, DBA, and T6 were cesarean-derived under aseptic conditions, foster-nursed on gnotobiotic ND2 mice, and barrier-sustained against reinfection. Sera of each of these strains of mice, and of the conventionally maintained stocks from which they originated, were tested for antibodies against the following viruses: Reo 3, Theiler's encephalomyelitis (GDVII), pneumonia virus of mice, K virus, polyoma, mouse adenovirus, Sendai, and mouse hepatitis. Antibodies against all of these viruses were found in the conventional colony. The cesarean derivation, gnotobiotic-foster-nursing, barrier-sustaining procedure was highly effective in limiting the viral spectrum of these strains of laboratory mice. The incidence of positive serology of 553-753 mice tested for each of these viruses in the conventional colony was 37, 33, 28, 23, 15, 15, 14 and 11% respectively. The incidence of positive serology of 522-583 mice tested in the cesarean-derived colony was 3, 3, 0, 0, 0, 0, 0 and 0% respectively. The significance of the low incidence of generally low titer reactions against Reo 3 and GDVII in the cesarean-derived colony is uncertain. Epizootic diarrhea of infant mice was present in the conventional colony but has not been observed in the cesarean-derived colony. Spontaneous leukemia occurs in the AKR strain in both the conventional and cesarean-derived colonies. - *Authors' summary*.

294. McLaughlin, R. E. (Agricultural Research Service, USDA, State College, Mississippi 39762). 1966. *Laboratory techniques for rearing disease-free insect colonies: elimination of Mattesia grandis McLaughlin, and Nosema sp. from colonies of boll weevils.* J. Econ. Entomol. 59: 401-404.

Mattesia grandis McLaughlin and a microsporidian, *Nosema* sp., were eliminated from the laboratory colonies of the boll weevil, *Anthonomus grandis*, by a system that utilized the "Family Unit". The system produced larger numbers of healthy insects more quickly than selection of progeny from single pairs of weevils. It had the disadvantage that it was more susceptible to failure because of its design. - R. J. Flynn.

295. Kaneuchi, C. (Institute of Physical and Chemical Research, Komagome, Hongo P.O., Tokyo, Japan), T. Mitsuoka, S. Yamamoto, and T. Sega. 1966. *Studies on the rearing of germfree chickens: I. A new germfree chicken cage* (in Japanese). Japan. J. Vet. Sci. 28: 1-9.

A new inexpensive germfree cage that can be used for experiments of 3 or 4 weeks' duration is described. The advantages of the cage are: (1) the feeder and waterer are made so that there is little loss of sterilized feed and so that drugs or test bacteria administered with feed are completely eaten by the chicks; (2) the feed and the inside of the cage are kept sanitary because the chicks cannot enter the feeder and waterer; (3) it is very easy to observe the inside of the cage because it is made of transparent glass; (4) it is very easy to remove the feces aseptically because the pressure inside the cage can be increased; (5) the temperature, humidity, and air flow can be easily controlled because the cages can be placed in an incubator; (6) contamination by bacteria is easily detected by means of a newly devised "bactytector" which is connected to the waterer; and (7) the aseptic measurement of a chick's body weight is possible with a simple weighing apparatus. The cage, has the following disadvantages: (1) it is not possible to rear chicks in it for more than 30 days; (2) not more than two chicks can be reared in one cage; and (3) the body weight of a chick measured inside the cage may not always be correct because the feces stuck to the wire-net floor may be measured with the chick. - Authors' summary modified.

296. Heneghan, J. B. (Louisiana State University School of Medicine, New Orleans, Louisiana 70112), C. E. Floyd, and I. Cohn, Jr. 1966. *Gnotobiotic dogs for surgical research.* J. Surg. Res. 6: 24-31.

Techniques for obtaining and maintaining gnotobiotic dogs for surgical research are described. Even though the techniques are constantly being refined, they are sufficient to rear healthy gnotobiotic dogs that can tolerate two major surgical procedures within 100 hr. The establishment of reliable techniques for rearing germfree dogs to sufficient size for surgical experiments presents the surgeon with a new tool that can be used to further knowledge of the role of bacteria in surgical problems. - Authors' summary.

297. Trexler, P. C. (Gnotobiotics Research Foundation, P.O. Box 369, Wilmington, Massachusetts 01887). 1966. *Contaminations*. Gnotobiotics Newsletter 2: 2-3.

Contamination control includes: (1) detection of contamination, (2) location of source, (3) elimination of contamination. The search for accidental contamination is the most important quality-control procedure. The pattern of contaminations will vary from laboratory to laboratory depending upon the microbiota in the environment and the type of operations. After the contamination has been found, it is imperative to determine the source as quickly as possible in order that remedial action can be taken. The following steps are recommended for locating the source of a contamination: (1) check procedures used by examining records and interviewing all personnel; (2) examine isolator, particularly gloves, for possible leaks; (3) if isolator is tight, the air intake filter and outlet device should be disassembled and carefully inspected; (4) the sterility of the supplies and apparatus introduced into the isolator should be questioned. A knowledge of the past history of contaminations in a laboratory will guide the investigator in tracking down the source of contamination. The type of microbe contaminating the isolator frequently provides a clue as to its origin. If a laboratory experiences appreciable contamination, all isolators whether contaminated or not should be leak-tested when taken out of service. - L. O. Bibbs.

298. Trexler, P. C. (Gnotobiotics Research Foundation, P.O. Box 369 Wilmington, Massachusetts 01887). 1966. *Steam sterilization as used in gnotobiotics*. Gnotobiotics Newsletter 2: 4-5.

To take full advantage of the reduced costs and versatility of a flexible film isolator, it was necessary to devise a method for sterilizing supplies in some sort of a package suitable for introduction into the working chamber. The first packages used were made of heat-resistant film. However, when routinely used by nontechnical personnel a low rate of contamination was experienced. This was correlated with rough handling and subsequent puncture of the flexible film. Because of this, a special metal drum was developed in which flexible film is limited to the closure of the open end (drum head). The drum is best used with a high vacuum sterilizer (20 mm Hg absolute). However, it can be used without a high vacuum autoclave by attaching an air vent that passes through the wall of the sterilizer. Temperature recorders are useful for monitoring, provided the sensing element is placed in the drain line from the chamber. Paper carrier-strips, seeded with known quantities of heat resistant spores, placed in the most impenetrable portion of the load, also appear to be a reliable test indicator. Minimal sterilization time should be determined by culturing both test strips and samples of the supplies. With properly designed drums and the effective removal of air, sterilization times in the drum are within 10% of sterilization times in the open autoclave chamber. A greater differential indicates inadequate processing or equipment. Long sterilization times for feed and other heat labile materials should be avoided because of thermal destruction resulting from uneven heating throughout the load. - L. O. Bibbs.

299. Heneghan, J. B. (Louisiana State University, School of Medicine, New Orleans, Louisiana 70112) and D. F. Gates. 1966. *Effects of peracetic acid used in gnotobiotics on experimental animals*. Lab. Animal Care 16: 96-104.

Although peracetic acid is the most widely used surface and space sterilizing agent in gnotobiotics, no previous work has been done to determine the effects of this agent on the animals that it protects. Peracetic acid carried into isolators during a sleeve-lock entry causes an increase in heart rate, blood pressure, and respiratory rate in anesthetized conventional and formerly germfree dogs. In nonanesthetized conventional rats, however, the procedure elicits only a slight increase in heart rate. Neither rats nor dogs show any significant changes in heart rate, blood pressure, or respiration when exposed to peracetic acid vapor after a simple lock entry. Simultaneous measurement of blood pressure with a blood pressure cuff around the tail and a femoral artery cannula revealed that changes in systemic pressure were accurately reflected in the tail. A method was devised to flush peracetic acid fumes from the lock of an isolator by rerouting the flow of air through the lock to the exhaust; volatile peracetic acid was carried out, reducing the problems of irritation. - *Authors' summary*.

300. Dymaza, H. A. (U. S. Army Natick Laboratories, Natick, Massachusetts 01760), G. S. Stoewsand, J. J. Enright, and D. Ament. 1966. *Diet and intestinal microflora interrelationships in the gnotobiotic rat* (abstract). Federation Proc. 25: 482.

Germfree rats fed a sterile semisynthetic, agar-gel diet containing 50% moisture had ceca which were 7.1% of body weight. The feeding of this diet in a dry powder form resulted in cecal enlargement to 13.1% of body weight. However, in rats mono- or poly-inoculated with either rat or human indigenous intestinal microorganisms, the physical characteristics of the diet (agar-gel or dry basis) had little influence on cecal size. The mono-establishment of a human indigenous *Fusiformis* sp. anaerobe in rats fed either the agar-gel or dry diet resulted in ceca making up 7.0% of body weight. Normal ceca amounting to 3.5% of body weight were produced in gnotobiotics by poly-inoculating with either rat or human intestinal organisms. - *Authors' summary modified*.

INFECTIOUS DISEASES

ONCOGENIC VIRAL DISEASES

301. Siegler, R. (Einstein Medical Center, Philadelphia, Pennsylvania 19141) and M. A. Rich. 1966. *Pathogenesis of viral murine myeloid leukemia* (abstract). Federation Proc. 25: 477.

Myeloid leukemia was induced by thymectomizing 3-5 day old Swiss ICR mice which had been inoculated at birth with "thymic" type leukemogenic virus. Between days 60-140, the 217 treated mice were bled for peripheral cell count and sacrificed. Analysis of histologic, hematologic, and pathologic findings indicated that a preleukemic phase of leucopenia occurred as mature myelocytes accumulated in the medullary cords of peripheral lymph nodes. Soon afterwards splenomegaly occurred, caused by proliferation of immature myeloblasts in the red pulp. The red pulp proliferation was in contrast to an atrophy of the splenic lymphoid follicles. With continued proliferation, these tumor-like myeloblasts detached and entered the splenic venous sinuses to appear in the liver and other organs. Myeloblasts were found in increasing numbers in the sternal bone marrow at this time. Continued proliferation and dissemination of these cells caused marked enlargement of the spleen and lymph nodes, and a continually rising peripheral white count which consisted almost exclusively of primitive myeloblasts. - *Authors' summary modified.*

302. Masurovsky, E. B. (Einstein Medical Center, Philadelphia, Pennsylvania 19141) and M. A. Rich. 1966. *Early development of murine leukemia virus in thymus* (abstract). Federation Proc. 25: 375.

To study the mechanisms of viral leukemogenesis it was important to characterize the earliest stages of virus proliferation. Infectivity studies suggested the thymuses as sites of early proliferation. Newborn Swiss mice inoculated (ip) with leukemia virus (Rich) were sacrificed with uninoculated controls at 0, 1, 2, 3, and 4 days. Right and left thymuses were thin sectioned and examined in the electron microscope. Although some virus-like particles were noted at earlier periods, the earliest evidence of significant viral replication was observed at two days. Two to four days following inoculation numerous virions were observed to bud from and accumulate in reticulated intracytoplasmic vacuoles within epithelial cells. In the epithelial cells observed, a positive correlation between these vacuolar formations and presence of budding virions was noted. Microvilli projected into the lumen of these vacuoles, which often were partially filled with a flocculent material. Typical virions appeared to bud from the tip of these microvilli and directly from the membranous border of the vacuoles. In the majority of mice examined to date, epithelial cells with these structures were observed predominantly in only one of the two thymuses. These electron microscopic findings support preliminary bioassay data which suggest the possibility that early viral proliferation, as well as the thymic lymphoma which subsequently develops, occurs in only one of two thymuses. - *Authors' summary.*

303. Berge, V. V. (Variety Children's Research Foundation, Miami, Florida 33155) and H. Baez. 1966. *A virus associated with rat leukemia transmitted by cell-free extracts* (abstract). Federation Proc. 25: 375.

Cell-free extracts of chemically-induced rat mammary tumors produced leukemia in rats. Successful transmission of this leukemia to newborn Sprague-Dawley rats by filtered extracts was achieved with three of the seven leukemias studied. The latency was 39 to 340 days with an incidence, in two consecutive passages, of 10% to 20%. Extracts of normal rat tissues failed to produce leukemia in 280 control rats. A filterable hemagglutinating virus (9H) was repeatedly recovered from the leukemic extracts upon inoculation of the latter into a line of rat embryo cells. Virus was also isolated from a persistently infected cell line derived from leukemic rat tissues. Passage of virus at low dilutions in rat embryo cells resulted in low titers with moderate cytopathology. It caused death in two to three weeks when inoculated into newborn hamsters; Sprague-Dawley rats were seldom affected. Virus passed in rat embryo cells at limiting dilutions resulted in about 100-fold higher titers. The virus is heat stable and neutralizable by anti-rat virus antiserum. It appears that 9H is a new strain of rat virus, possibly associated and interacting with a leukemogenic agent of the rat. - *Authors' summary modified.*

304. Swaen, G. J. V. (Wilhelmina Gasthuis, Amsterdam, The Netherlands). 1966. *Development of thymic neoplasms in rats inoculated with a murine leukemia virus (Rauscher)*. J. Natl. Cancer Inst. 36: 1027-1048.

The lesions following inoculation of the Rauscher virus into newborn Osborne-Mendel rats are described. An early splenomegaly resulting from a hyperplasia of the blood-forming elements was found. The hyperplasia was chiefly erythroblastic. Later, an increased number of macrophages was found in the thymus, followed by an atrophy with nearly complete loss of thymic lymphocytes, and, finally, within the atrophied thymus malignant cells appeared. A variety of lymphocytic neoplasms was induced and also neoplasms apparently derived from the thymus epithelium. In all instances, the neoplastic cells first appeared in the thymus. - *Author's summary.*

305. Dunn, Thelma, B. (National Institutes of Health, Bethesda, Maryland 20014) and A. W. Green. 1966. *Morphology of BALB/c mice inoculated with Rauscher virus*. J. Natl. Cancer Inst. 36: 987-1001.

A morphologic study was made of inbred BALB/c mice inoculated with the Rauscher virus. The initial effect was a rapid proliferation of erythroblastic cells in the red pulp of the spleen. Later the spleen was enormously enlarged and resembled a blood-filled sponge. Erythroblastic proliferation also appeared in the liver. Two groups of mice, one that received an early virus preparation and the other a virus recovered from rats, developed lymphocytic leukemia. Thymectomy had no apparent effect on the erythroblastic reaction, while splenectomy intensified the process in the liver, and erythroblastic foci appeared in the lymph nodes. Granulocytopoiesis was also stimulated in some mice. The mechanism by which the virus produced the intense blood cell proliferation was not determined. The variability in the reactions of mice to the inoculation of the Rauscher virus is emphasized.

- *Authors' summary.*

306. Silvestre, D. (Institut de Recherches sur les Leucémies, Hôpital Saint-Louis, Paris 10, France), J.-P. Lévy, J.-C. Leclerc, and M. Boiron. 1966. *Etude ultrastructurale du cycle du virus de Rauscher chez la souris (Ultrastructural study of the Rauscher virus cycle in the mouse)*. Pathol. Biol. 14: 559-564.

Electronic microscopic study of the viral particles which appear in the organs of the BALB/c mouse inoculated with Rauscher's virus shows the presence of the virus in the megakaryocytes of the spleen from the fourth day onwards, in the marrow from the seventh day, and progressively from that day in all the hemopoietic tissues after the 12th day. The largest number of particles are seen in the spleen and the medulla. The same findings are seen in the C57BL/6 mouse, in which the disease does not have an early splenic phase as in the BALB/c mouse. - *Authors' summary*.

307. Dunn, Thelma B. (National Institutes of Health, Bethesda, Maryland 20014), R. A. Malmgren, Paula G. Carney, and A. W. Green. 1966. *Propylthiouracil and transfusion modifications of the effects of the Rauscher virus in BALB/c mice*. J. Natl. Cancer Inst. 36: 1003-1025.

Groups of mice inoculated with the Rauscher virus were treated with different substances to determine whether the characteristic erythroblastic reaction and the survival time could be altered when compared with those of untreated virus-inoculated controls. The feeding of liver, injection of vitamin B₁₂, or folic acid, administration of chloramphenicol or ferrous sulfate, thyroidectomy, or bleeding proved ineffective. Propylthiouracil added to the food prolonged life and altered the morphology of the spleen. Repeated blood transfusions inhibited the erythroblastic reaction and prolonged the survival time. - *Authors' summary modified*.

308. Jensen, M. M. (UCLA Medical School, Los Angeles, California 90033) and A. F. Rasmussen, Jr. 1966. *Influence of stress on leukemia virus induced splenomegaly* (abstract). Federation Proc. 25: 375.

The host response to Rauscher leukemia virus was shown to be altered by nonspecific stressors. Infected Swiss albino mice subjected to sound or avoidance-learning stress developed significantly smaller spleens than nonstressed infected mice. This difference was most pronounced when the mice were sacrificed from 10 to 18 days after a relatively large viral inoculum. Stress applied before the viral injection had no influence on spleen size, while stress initiated immediately after or as late as one week after inoculation markedly retarded splenic hyperplasia. This response appeared to be directed against the virus-induced cellular proliferation and not against the virus. Stress did not suppress virus-induced splenomegaly in adrenalectomized mice, thus suggesting that the stress response was due to a hypersecretion of adrenocorticoids. When the infection was allowed to proceed, survival times were generally longer in the stressed mice. - *Authors' summary*.

309. Gerber, P. (National Institutes of Health, Bethesda, Maryland 20014), T. E. O'Connor, and Suzette M. Birch. 1966. *Murine leukemia viruses: antigenic studies by quantitative complement fixation*. Science 152: 1074-1075.

The murine leukemia viruses of Rauscher and Friend, derived from plasma of infected BALB/c mice, was purified. Their antigenic relationship was studied by quantitative complement-fixation reactions with the virion antigen and homologous antisera. The complement-fixation curves observed in cross reactions indicated close antigenic similarity between these two leukemia viruses. Highly purified viral preparations contained detectable amounts of host antigens. - *Authors' summary*.

310. Gross, L. (Veterans Administration Hospital, Bronx, New York 10468). 1966. *The Rauscher virus: a mixture of the Friend virus and of the mouse leukemia virus (Gross)?* Acta Haematol. 35: 200-213.

The Rauscher virus can induce, in susceptible mice, considerable enlargement of spleen and liver, and a characteristic blood picture, pathologic features identical with those resulting from inoculation of the Friend virus. In certain strains of mice, however, and also in rats, the Rauscher virus can induce thymic lymphosarcomas, and other conventional forms of leukemia commonly observed following inoculation of the mouse leukemia virus (Gross). This dual pathogenic potency could be explained by an assumption that the Rauscher virus filtrate consists of a mixture of the Friend virus and of the mouse leukemia virus (Gross). Results of experiments here reported are consistent with such an assumption. Following several serial passages through rats, a species relatively resistant to the Friend virus, the Rauscher virus lost its ability to induce Friend virus syndrome on mouse bioassay. Furthermore, the ability of the rat-adapted Rauscher virus to induce thymic lymphosarcomas could be inhibited by neutralization *in vitro* with the Gross mouse leukemia virus immune serum. The mouse leukemia virus (Gross), as well as the Friend virus, and the Rauscher virus strain, have similar physical properties, and are indistinguishable in their morphology on electron microscopic examination. - *Author's summary*.

311. Wheelock, E. F. (School of Medicine, Western Reserve University, Cleveland, Ohio 44106). 1966. *The effects of nontumor viruses on virus-induced leukemia in mice: reciprocal interference between Sendai virus and Friend leukemia virus in DBA/2 mice*. Proc. Natl. Acad. Sci. U.S. 55: 774-780.

Sendai virus inoculated into DBA/2 mice as long as three weeks prior to Friend virus markedly reduced the splenomegaly response to Friend virus. This effect is dependent upon the route of inoculation: both viruses must be administered intraperitoneally. Newcastle disease, vesicular stomatitis, and Sindbis viruses have no such Friend virus-inhibiting properties. - *Author's summary modified*.

312. Odaka, T. (Institute for Infectious Diseases, Shiba Shirokanedai-Machi, Minato-Ku, Tokyo, Japan) and T. Yamamoto. 1966. *Inheritance of susceptibility to Friend mouse leukemia virus: III. Susceptibility of F_1 and genotypes of F_2 and backcross progeny.* Japan. J. Exptl. Med. 36: 23-31.

An earlier observation that a single autosomal gene governs the susceptibility of mice to Friend leukemia virus was confirmed by crossing sensitive DDD with resistant C57BL/6 mice. It was furthermore found that the susceptibility of F_1 mice was intermediate between those of parent strains. Genotypes of F_2 and backcross progeny were analyzed by mating to C57BL/6 mice. The segregation ratios in these generations are compatible with the assumption of existence of one major gene controlling the susceptibility. - *Authors' summary.*

313. Dawson, P. J. (University of Newcastle, Newcastle upon Tyne, England), Wendy M. Rose, and A. H. Fieldsteel. 1966. *Lymphatic leukaemia in rats and mice inoculated with Friend virus.* Brit. J. Cancer 20: 114-121.

Lymphatic leukemia occurring in rats inoculated with Friend virus is described and characterized. While mice inoculated with tissue extracts from the first rat passage developed Friend disease, mice inoculated with extracts from subsequent rat passages developed lymphatic leukemia. Occasional mice from the latter group showed Friend disease or a combination of both lymphatic leukemia and Friend disease. These findings suggest that Friend virus may be a mixture of viruses. - *Authors' summary.*

314. Klein, G. (Karolinska Institutet Medical School, Stockholm, Sweden), Eva Klein, and G. Haughton. 1966. *Variation of antigenic characteristics between different mouse lymphomas induced by the Moloney virus.* J. Natl. Cancer Inst. 36: 607-621.

A number of mouse lymphomas induced by the Moloney agent were compared with regard to 1) their sensitivity to the rejection response of syngeneic mice preimmunized with Moloney virus-containing materials; 2) their susceptibility to the cytotoxic action of sera from resistant syngeneic animals; 3) their ability to release virus, estimated by the mouse antibody production test; and 4) their concentration of tumor-specific cell surface antigen, judged by the indirect fluorescent-antibody test and by absorption and inhibition experiments. The different parameters studied varied between different lymphomas, whereas individual lymphomas showed characteristic and well-reproducible patterns of behavior. - *Authors' summary modified.*

315. Tennant, Judith R. (Sloan-Kettering Institute for Cancer Research, New York, New York 10021). 1966. *Susceptibility and resistance to viral leukemogenesis in the mouse. III. Effect of added thymus tissue from a susceptible strain upon the response of two resistant strains.* J. Natl. Cancer Inst. 36: 599-606.

The induction of lymphoid leukemia by the BALB/Tennant-leukemia (B/T-L) virus was increased from 50% to 80-100% (with no shortening in latent period) in small numbers of BALB/c adults by the simultaneous introduction with the virus of trocar-implanted thymus tissue, or of free thymus cells, from susceptible BALB/c sucklings. Addition of free BALB/c thymus cells to B/T-L virus inoculums also increased leukemogenesis in the highly resistant C57BR/cd strain, from 9% (with an average latent period of 14.5 months) to 30% (with an average latent period of 6.5 months). BALB-thymus-associated lymphoid leukemias thus induced in C57BR mice were transplantable to C57BR but not to BALB/c adults. The "BR-th/T-L" virus recovered from these leukemias manifested a broadened host range, as compared to original B/T-L filtrates. Leukemogenesis by the virus was not enhanced, however, in sucklings of the resistant C3HeB/Fe strain when thymus tissue or free thymus cells were similarly transferred from BALB/c sucklings. - *Author's summary.*

316. Smith, G. H. (National Institutes of Health, Bethesda, Maryland 20014). 1966. *Role of the milk agent in disappearance of mammary cancer in C3H/StWi mice.* J. Natl. Cancer Inst. 36: 685-701.

In 1958, 11 years after the establishment of inbred C3H/StWi mice at Brown University, mammary carcinoma ceased to develop. Another subline, C3H/AnWi, maintained under identical conditions, continued to develop mammary tumors. Reciprocal foster-nursing experiments were carried out between the two sublines. The presumably tumor-free C3H/StWi females were found highly susceptible to the mammary tumor agent (MTA) from the C3H/AnWi subline. Furthermore, the infected C3H/StWi mothers subsequently passed the agent efficiently to their offspring. On the other hand, C3H/AnWi females fostered on C3H/StWi mothers developed a smaller percentage of tumors and only after a prolonged latent period. They did not readily pass the agent to their offspring. Samples from 28 of 63 tumors resulting from the reciprocal foster-nursing experiments were examined with the electron microscope. In every instance intracellular and extracellular particles representing the MTA were observed. The results from combined bioassay and correlative electron microscopy are interpreted to indicate that the C3H/StWi subline does not harbor an active MTA. The appearance of mammary tumors in the C3H/AnWi mice foster-nursed by C3H/StWi mothers could be explained by *in utero* infection by the male, directly or indirectly. Evidence for this hypothesis is the observation of virus-like particles identical to the MTA in thin sections of the cauda epididymis and seminal vesicles from C3H/AnWi males and from C3H/StWi males infected with MTA, but not from uninfected C3H/StWi males. - *Author's summary.*

317. Nandi, S. (University of California, Berkeley, California 94720), M. Handin, and L. Young. 1966. *Strain-specific mammary tumor virus activity in blood of C3H and BALB/c f. C3H mice*. J. Natl. Cancer Inst. 36: 803-808.

The blood of male, multiparous nonpregnant female, pregnant female, and lactating female C3H and BALB/c f. C3H mice was tested for mammary tumor virus (MTV) activity with the noduligenic assay for MTV. When tested in three-week-old C3Hf hosts, MTV activity was detectable in blood of all C3H donors, whereas blood from BALB/c f. C3H donors was capable of infecting three-week-old BALB/c hosts with MTV. In contrast, MTV infection only rarely occurred in young (one to three days or three weeks of age) BALB/c hosts inoculated with C3H blood, and MTV activity was rarely detected when blood from BALB/c f. C3H donors was tested in young C3Hf hosts. These results, as well as those of previous findings, suggest that blood-borne MTV activity in BALB/c f. C3H and C3H mice may be strain-specific and may differ qualitatively from MTV activity in mammary tissues. - *Authors' summary*.

318. Mori, R. (Kyushu University, Fukuoka, Japan), K. Nomoto, G. Kimura, and K. Takeya. 1966. *Effect of thymectomy on polyoma tumor induction in CF 1 mice*. Arch. Ges. Virusforsch. 18: 186-197.

In CF 1 mice thymectomized and inoculated with polyoma virus at birth, tumor formation was markedly accelerated; by 70 to 82 days after polyoma virus inoculation, tumors developed in 100% of neonatally thymectomized mice, while less than 20% of control mice developed tumors. Furthermore, grossly apparent polyoma tumors were produced in neonatally thymectomized CF 1 mice when inoculated with polyoma virus at 21 days of age: of 18 neonatally thymectomized and polyoma virus inoculated weanling mice, three were found to have grossly apparent tumors 100 to 150 days after the virus inoculation. By varying the days of operation and of virus inoculation after birth, it was found that operation two days after birth was as effective as thymectomy at birth, and inoculation of polyoma virus into neonatally thymectomized mice as late as seven days after birth was as effective as inoculation at birth. These results suggest that neonatally thymectomized mice may be useful as hosts in studies searching for oncogenic viruses. - *Authors' summary modified*.

319. Plagemann, P. G. W. (University of Minnesota, Minneapolis, Minnesota 55455) and H. E. Swim. 1966. *Relationship between the lactic dehydrogenase-elevating virus and transplantable murine tumors*. Proc. Soc. Exptl. Biol. Med. 121: 1142-1146.

The following murine tumors were propagated serially *in vitro*: Sarcoma 180, Hauschka-Klein ascites tumor, and hepatomas 129 and 134. The lactic dehydrogenase-elevating virus initially associated with all of these tumors *in vivo* did not multiply in cell cultures and by serial propagation *in vitro* the tumors were freed from the virus. The results indicate that the relationship between the lactic dehydrogenase-elevating virus and transplantable mouse tumors is that of a common contaminant. The "virus-free" tumor cells produced tumors when implanted into mice. The growth rate and transplantability of these tumors was the same in normal mice and in mice infected intentionally with the virus. - *Authors' summary*.

320. Deinhardt, F. (Presbyterian-St. Luke's Hospital, Chicago, Illinois 60612). 1966. *Neoplasms induced by Rous sarcoma virus in New World monkeys*. Nature 210: 443.

Subcutaneous inoculation of partially purified (cell-free) Rous sarcoma virus of the Schmidt-Ruppin strain (RSV-SR) produced invasive, metastasizing sarcomata in all of five newborn marmosets, *Saguinus* sp., that were injected within 25 hours after birth. Tumors were first observed within 20-90 days after inoculation of the virus and all died of the neoplasia between 35 and 117 days. The tumors were classified as immature sarcomata giving positive staining reactions for fat in most cells. The tumors were locally invasive and metastasized to the lungs. The use of this virus-host system as a laboratory model for the study of neoplasia in primates is discussed. - T. E. Fritz.

OTHER VIRAL DISEASES

321. Schmidt, Nathalie J. (Viral and Rickettsial Disease Laboratory, California State Department of Public Health, Berkeley, California 94704), E. H. Lennette, and Maureen F. Hanahoe. 1966. *Microneutralization test for the reoviruses. Application to detection and assay of antibodies in sera of laboratory animals*. Proc. Soc. Exptl. Biol. Med. 121: 1268-1275.

A microneutralization technique has been developed to measure reovirus type 3 antibodies in mouse, hamster and rat sera. The test is conducted in a HeLa cell system in disposable microplates and can be read colorimetrically. The results obtained correlate well with those obtained in conventional neutralization tests. The test is more specific than the HI test and is particularly useful for monitoring rodent colonies. - P. C. Brennan.

322. Jenson, A. B. (Baylor University College of Medicine, Houston, Texas 77025), E. R. Rabin, D. C. Bentinck, and F. Rapp. 1966. *Reovirus viremia: an electron microscopic, immunofluorescent, and virus assay study* (abstract). Federation Proc. 25: 422.

Viremia was produced in newborn Swiss mice after subcutaneous inoculation of $10^{4.3}$ plaque-forming units (PFU) of reovirus type 1. Virus was not detected in the blood until four days after inoculation. Titers in whole blood increased from 10^5 PFU/ml on day five to 10^6 PFU/ml on day seven. At the same time, the buffy coat was about 50 to 60 times more infectious than whole blood. The indirect immunofluorescence technique revealed that reovirus antigen was rarely localized in circulating leukocytes on days two through seven; particulate debris of varying size did react, especially during the later stages of infection. Buffy coat preparations observed with the electron microscope revealed occasional membrane-bound structures containing reovirus particles intermixed with cell debris. Reovirions were also sporadically noted in crystalline array in large cell-free aggregates. No virus particles were observed in leukocytes and platelets although large numbers of these structures were examined in ten

specimens taken two to seven days after inoculation. These observations suggest that reovirus viremia is the result of cell necrosis occurring in various tissue sites with subsequent release of reovirions into the vascular space. - *Authors' summary.*

323. Massie, E. L. (Armed Forces Institute of Pathology, Washington, D. C. 20012) and E. D. Shaw. 1966. *Reovirus type 1 in laboratory dogs.* Am. J. Vet. Res. 27: 783-787.

Virologic investigations of reovirus type 1 disease were made in 133 dogs (approximately 5%) that were utilized by various laboratories in experimental research. All dogs were mixed breeds, over two years old, and weighed at least 11 kg. All dogs accepted by the laboratories were vaccinated against canine distemper, leptospirosis, infectious canine hepatitis, and rabies. Approximately 33% of all dogs routinely accepted by the laboratories contracted a respiratory disease after ten days in the kennels. Dogs that were initiated into the study group for this report were given a physical examination, and nasal-throat and rectal swabs were taken as well as a blood sample. Reovirus type 1 was isolated from four of the 133 dogs investigated. The isolated virus was injected into weanling pups, and signs of respiratory disease were produced. Reovirus type 1 was reisolated from the inoculated pups. The hemagglutination-inhibition antibody titers of the inoculated dogs were significantly elevated in the convalescent serums. In a survey of the original population sample of 133 dogs, a hemagglutination-inhibition antibody titer of ten or greater was demonstrated in 40 dogs. - *Authors' summary.*

324. Christensen, L. R. (New York University Medical Center, New York, New York 10016), S. Weisbroth, and B. Matanic. 1966. *Detection of ectromelia virus and ectromelia antibodies by immunofluorescence.* Lab. Animal Care 16: 129-141.

Immunofluorescence affords a more sensitive and reliable method for detection of ectromelia antibody, particularly in those animals without overt evidence of disease, than does the hemagglutination-inhibition test. Ectromelia can infect mice without the production of overt signs, histological evidence, or production of antibody detectable by the HAI test. Such mice do produce antibody detectable by infected cell-culture-immunofluorescent technic. With suitable antiserums, ectromelia or rabbit pox antigens are readily detected in tissue impressions from animals in the acute phase of overt disease. About two weeks after infection viral antigen cannot be demonstrated in such tissue impressions, presumably due to blockage by the animal's own antibody. - *Authors' summary.*

325. Piazza, M. (Universite de Naples, via D. Cotugno, Naples, Italy) and J.-C. Salomon. 1966. *Présence dans le contenu et la paroi de l'intestin des souris axéniques et classiques d'une substance inhibant le pouvoir infectieux du virus de l'hépatite de souris (Presence in the intestinal wall and contents of axenic and conventional mice of a substance which inhibits the infectiousness of mouse hepatitis virus)*. Comp. Rend. 262: 1159-1162.

Serial dilutions of mouse hepatitis virus, MHV-3, were mixed with saline homogenates of the intestinal walls and contents of C3H/J, BALB/c and C57/BL conventional and axenic mice, and the virus-homogenate mixtures were inoculated into Swiss mice. The results suggest the presence in the homogenates of a substance which inactivates the virus. It is also present in axenic mice but to a lesser extent than in conventional mice. - P. C. Brennan.

326. Melendez, L. V. (Primate Research Center, Harvard Medical School, Boston, Massachusetts 02115), R. D. Hunt, and N. W. King. 1966. *A latent nuclear inclusion agent isolated from sand rats (Psammomys obesus)* (abstract). Federation Proc. 25: 615.

A viral agent that produces the development of intranuclear inclusions in various cell cultures *in vitro* has been isolated from sand rats. The agent behaves very much like a virus of the herpes group. - R. J. Flynn.

327. Galton, M. (Dartmouth Medical School, Hanover, New Hampshire 03755) and L. Kilham. 1966. *Chromosomes of "mongoloid" hamsters* (abstract). Federation Proc. 25: 234.

Suckling Syrian (golden) hamsters given an intracerebral inoculation of certain viruses develop a stunting syndrome associated with tooth and facial abnormalities. The resemblance of this condition to human mongolism has led to the suggestion that similar etiologic mechanisms might be involved in the two disorders. Since human mongols possess a chromosome anomaly (trisomy G₁ [21-22]), the karyotype of "mongoloid" hamsters was analyzed for possible aberrations. Six hundred seventy two metaphase preparations were obtained from eight adult "mongoloid" hamsters, either directly from bone marrow following hemolytic stimulation or after short-term culture of explants of granulation tissue from the bed of skin autografts. Karyotypes were prepared from 385 metaphases and compared with 200 karyotypes obtained by the same methods from healthy uninoculated hamsters. Approximately 70% of metaphases in both groups possessed the normal complement of 44 chromosomes. Karyotype irregularities, such as monosomies, trisomies and size inequality of homologous chromosome pairs, appeared with equal frequency in metaphases from "mongoloid" and normal hamsters. It is concluded that a stable gross alteration of the karyotype does not accompany viral-induced "mongolism" in hamsters. - Authors' summary.

328. Henson, J. B. (Washington State University, Pullman, Washington 99163), R. C. Williams, Jr., and J. R. Gorham. 1966. *Infectious fractions of serum producing Aleutian disease in mink* (abstract). Federation Proc. 25: 684.

Pooled serum from mink with Aleutian disease was fractionated using zone electrophoresis, gradient-elution chromatography and Sephadex G-200. Separate fractions were tested for their ability to produce the disease by inoculation into groups of five mink. Starch block fractions showed no differential infectivity, infections being established by gamma, beta, alpha and albumin zones. The first peak of G-200 gel filtration produced no infections, whereas the two aftercoming peaks contained infectivity. Chromatographic gradient-fractionation revealed no infectivity within the first peak and aftercoming fractions until peaks eluted with pH 5.5, 0.2M phosphate buffers. These latter fractions reproducibly induced the disease in several groups of mink tested. Electron microscopic study of ultracentrifuged pellets from chromatographic fractions known to contain the infectious principle showed no evidence of discernable viral particles. - *Authors' summary modified.*

329. Phillips, L. L. (Columbia University, New York, New York 10027) and J. B. Henson. 1966. *Coagulation changes in Aleutian mink disease* (abstract). Federation Proc. 25: 620.

Aleutian disease in mink results in pathologic changes suggestive of intravascular coagulation. Therefore an investigation was undertaken to determine changes in coagulation factors during the development of the disease. Screening tests such as prothrombin, stypven and partial thromboplastin times were constant throughout the nine weeks of study. Factors II and V remained steady over the first five weeks and then increased. Factor VIII rose to a maximum at three weeks and thereafter showed cyclical variations. Fibrinogen after an initial decrease varied from week to week. Profibrinolysin showed a trend toward higher levels between the fifth to the seventh weeks while inhibitor levels were lower during this period. Platelet counts decreased steadily during the nine-week study. The results observed are consistent with those expected from a slow process of intravascular coagulation in which some factors are temporarily decreased. - *Authors' summary modified.*

330. Kilham, L. (Dartmouth Medical School, Hanover, New Hampshire 03755) and G. Margolis. 1966. *Viral etiology of spontaneous ataxia of cats*. Am. J. Pathol. 48: 991-1004.

Isolation of an agent termed feline ataxia virus (FAV) from the cerebellum of a kitten suffering from the spontaneous cerebellar disease, suggests that this condition is of viral origin. FAV has been carried through three continuous passages in kittens and nine in ferrets. It has induced intranuclear inclusions when inoculated into either of these animals, with subsequent destruction of the external germinal layer of the cerebellum and varying degrees of injury to Purkinje cells. Animals receiving inoculations developed marked degrees of cerebellar ataxia when kept for periods of four to five weeks. Especially severe cerebellar damage was found in one kitten at birth, following inoculation *in utero* three weeks previously.

Description is given of the major features of the pathologic alterations encountered in cats with the spontaneous disease as well as in cats and ferrets which received FAV by inoculation. FAV is filterable, resistant to ether and to heat (60 C for 30 minutes) and is neutralized by serum from kittens convalescent from the spontaneous disease. It has not been neutralized by rat virus antiserum. - *Authors' summary.*

331. Hsiung, G. D. (New York University School of Medicine, New York, New York 10016) and T. Atoyant. 1966. *Incidence of naturally acquired virus infections of captive monkeys.* Am. J. Epidemiol. 83: 38-47.

Cell cultures prepared from the kidneys of 393 healthy, asymptomatic rhesus (*Macaca mulatta*), green (*Cercopithecus aethiops*), patas (*Erythrocebus patas*) and occasionally other monkey species were examined for simian virus infection. A total of 127 tissue cultures were examined and 107 virus isolates were made from 77. SV₅ was the most prevalent virus type (38 isolates) followed by foamy agents (32 isolates), SV₄₀ (17 isolates), measles virus (12 isolates) and an unidentified agent (7 isolates). Mixed infections occurred in 30 lots of cultures, 11 of which were prepared from individual monkey kidney. In monkeys held in quarantine for two months, the incidence of virus infection was low. The virus isolation rate was high, however, in newly arrived animals. Therefore, it is suggested that monkeys kept in quarantine for two to three months may be more satisfactory for tissue culture preparations. - *Authors' summary modified.*

332. Holmes, A. W. (Presbyterian-St. Luke's Hospital, Chicago, Illinois 60612), J. A. Devine, E. Nowakowski, and F. Deinhardt. 1966. *The epidemiology of a herpes virus infection of New World monkeys.* J. Immunol. 96: 668-671.

Utilizing a virus neutralization test on serum from several species of monkeys collected from a variety of sources, the distribution of natural antibodies to the marmoset herpes virus (*Herpesvirus tamarinus*) was studied. On the basis of the immunologic data presented and other data which the authors previously reported it appears that the virus is indigenous to squirrel, spider, and cinnamon ringtail monkeys. It usually produces a nonfatal infection in them but it may cause an acute exacerbation at the time of capture. When marmosets or owl monkeys come in contact with infected New World monkeys they may develop an acutely fatal illness. Because of the variety of New World monkeys carrying this agent, the authors suggest that the name *Platyrrhine herpesvirus* or *Herpesvirus platyrrhinae* might identify it more correctly. - *T. E. Fritz.*

333. Kalter, S. S. (Southwest Foundation for Research and Education, San Antonio, Texas 78215), I. A. Ratner, H. A. Britton, A. K. Eugster, T. E. Vice, A. R. Rodriguez, and A. G. Hendrickx. 1966. *Abortions in pregnant baboons following inoculations with adenovirus, type 12 (abstract).* Federation Proc. 25: 616.

In an attempt to enhance the oncogenic capability of adenovirus, type 12, a number of pregnant baboons, monkeys and hamsters were inoculated with this virus at various stages of pregnancy. Six of six baboons and two of

three rhesus monkeys aborted between seven and 68 days after inoculation. Six control baboons injected with various control materials did not abort. Four of five pregnant hamsters either aborted or demonstrated uterine and fetal pathology. Control hamsters were not affected. The fetus of one baboon in which pregnancy was terminated surgically demonstrated adenovirus, type 12, in the liver, lung and brain by immunofluorescence. Positive neutralizing antibody was found only in the one infant monkey and its mother. All attempts to isolate virus from these animals were unsuccessful. - *Authors' summary modified.*

BACTERIAL AND MYCOTIC DISEASES

334. Gekker, V. D. (Institut Epidemiologii i Mikrobiologii im. Gamalen, AMN-SSSR, Moscow, U.S.S.R.), M. A. Tumanyan, Z. K. Stasilevich, and L. K. Stepanova. 1966. *The efficacy of specific vaccination of monkeys against paratyphoid* (in Russian). Zh. Mikrobiol. Epidemiol. Immunobiol. 1966: 112-117.

The experimental production of enteric salmonella infection in rhesus monkeys (*Macaca mulatta*), using cultures of *Salmonella stanley*, is described. Also given are the results of a study of the efficacy of prophylactic immunization with *S. stanley* vaccines. Heated, carbolized vaccines produced a strong immunity. When the animals were infected with paratyphoid after immunization with such a vaccine obtained by water-salt extraction, the induced infection was mild. - *Authors' summary modified.*

335. Kent, T. H. (Walter Reed Army Institute of Research, Washington, D. C. 20012), S. B. Formal, E. H. LaBrec, and A. Takeuchi. 1966. *Diffuse enteritis due to Salmonella typhimurium in opium-treated guinea pigs* (abstract). Federation Proc. 25: 456.

In man, organisms of the genus *Salmonella* are most frequently associated with symptoms of acute enteritis, while most small laboratory animals develop a typhoid-like disease when challenged with salmonellae. The authors were able to produce an acute enteritis in guinea pigs by treating the animals with opium at the time of challenge with *S. typhimurium*. Normal guinea pigs given 10^8 *S. typhimurium*, intragastrically, died in four to ten days with granulomatous lesions in the spleen, liver, lymph nodes and intestinal lymphoid patches. In contrast, guinea pigs given opium at the time of challenge with 10^8 *S. typhimurium* died within three days with a severe diffuse ileitis and moderate jejunitis. *Salmonella* were able to multiply in the small intestine of opium-treated guinea pigs; whereas, organisms were rapidly cleared from the small intestine in animals which did not receive opium. Invasion of the epithelium and lamina propria of the ileum in opium-treated animals was demonstrated by fluorescent antibody techniques and by electron microscopy. Intestinal motility appears to be an important factor in determining the extent of bacterial invasion of the intestinal mucosa. - *Authors' summary modified.*

336. Faddoul, G. P. (University of Massachusetts, Waltham, Massachusetts 02154), G. W. Fellows, and J. Baird. 1966. *A survey on the incidence of salmonellae in wild birds*. Avian Diseases 10: 89-94.

Salmonella infection was identified in 12 of 100 groups of wild birds examined. Eight outbreaks of *S. typhimurium* infection were identified in brown-headed cowbirds, two outbreaks of *S. typhimurium* infection in house sparrows, one *S. typhimurium* infection in white-throated sparrow and one *S. derby* infection in a herring gull. - R. J. Flynn.

337. Jameson, J. E. (Public Health Laboratory, Brighton, East Sussex, England). 1966. *Differentiation of Salmonella strains by colonial morphology*. J. Pathol. Bacteriol. 91: 141-148.

A method is described for differentiating epidemiologically unrelated strains of *Salmonella* according to the pattern of convolution, or wrinkling, of the surface of macrocolonies grown under standardized conditions on special media. The convolutions occur in a wide range of "patterns", which can be differentiated visually. - Author's summary.

338. Rauss, K. (Institute of Microbiology, University Medical School, Pécs, Hungary), I. Kétyi, and T. Angyal. 1966. *Experimental shigellosis in mice*. Pathol. Microbiol. 29: 95-110.

The authors were able to infect mice orally only with virulent shigella mutants selected on the basis of the refractivity of agar plate colonies. These mutants also gave rise to keratoconjunctivitis in guinea pigs. Infection of the mouse resulted in a prolonged symptomless excretion, beginning about one hour after the administration of the causative agent. The small intestine was transiently free from shigellae. The coli flora exerted a considerable, but not absolute defense against infection. Mice depleted of their coli flora by streptomycin treatment could be infected with a few cells of virulent mutants. Superinfection of shigella-excreting mice with *E. coli* resulted in a reduction in the number of excreted shigellae. Shigellae invaded the lymphatic tissues of the intestinal wall. Sometimes they were isolated from mesenteric lymph nodes. Bacteremia and the presence of shigellae in the liver or spleen were never observed. Infection with shigellae resulted in gradually increasing, protective, serum-antibody titers and rapidly rising, highly protective, coproantibody titers. The experimental findings are discussed and the suitability of mouse model experiments in studying the problems of human dysentery are pointed out. - Authors' summary.

339. Hightower, D. (Walter Reed Army Medical Center, Washington, D. C. 20012), H. T. Uhrig, and J. I. Davis. 1966. *Pseudomonas aeruginosa infection in rats used in radiobiology research*. Lab. Animal Care 16: 85-92.

The effect of *Pseudomonas aeruginosa* infection in rats exposed to gamma radiation has been investigated. In the dose range of 750-1000 R, 83% of the animals dying in the first 12 days had positive spleen cultures while only 7% of those dying in the next 18 days were similarly positive. Two groups of rats, one considered infected and one noninfected on the basis of water-

bottle, drinking-tube cultures, were irradiated. The infected group had a higher incidence of deaths and positive cultures. Different screening methods were investigated to determine the presence of *P. aeruginosa* in the rat colony. Culture of drinking-tube swabs was found to be the method of choice. The use of chlorinated drinking water appeared to reduce the number of positive drinking tubes. This observation led to the conclusion that its routine use decreased the probability of spread of the infection through the drinking apparatus. - *Authors' summary.*

340. Millican, R. C. (National Institutes of Health, Bethesda, Maryland 20014), G. Evans, and K. Markley. 1966. *Susceptibility of burned mice to Pseudomonas aeruginosa and protection by vaccination.* Ann. Surg. 163: 603-610.

Mice given a moderate burn in water at 70 C were extremely susceptible to intraperitoneal injection of a dose of *Pseudomonas aeruginosa* that is nonlethal to normal mice. Susceptibility to *P. aeruginosa* disappeared, however, five days after the burn. Parenteral administration of specific vaccines, before or after the burn, affords significant protection to burned mice given a *P. aeruginosa* challenge that is lethal to normal mice. These results suggest that thermal trauma does not block the immunologic response to bacterial antigens. For this reason specific vaccines administered after thermal trauma in man might protect burned patients from death due to bacterial septicemias. - *Authors' summary modified.*

341. Janovski, N. A. (U. S. Naval Hospital, Beaufort, South Carolina 29902). 1966. *Arthropathy associated with Escherichia coli septicemia in caged birds.* J. Am. Vet. Med. Assoc. 148: 1517-1522.

Crippling inflammation of the joints of lower extremities associated with arthropathy and *Escherichia coli* septicemia has been observed in caged birds. The arthropathy is characterized by progressive polyarticular arthritis of serofibrinous or seropurulent type, assuming occasionally a granulomatous type of inflammatory response. A case in a six-month-old male finch is described. Gram-negative coliform organisms were found in the affected limb tissues, and *E. coli* in the visceral organs. The disorder was attributed to direct infection of the lower extremities via fecal contamination or to delayed hypersensitivity to *E. coli*. - *Author's summary modified.*

342. Haughton, L. J. (Public Health Laboratory, Stafford, England) and P. Minkin. 1966. *Some aspects of pseudotuberculosis among a small colony of guinea pigs.* J. Inst. Animal Tech. 17: 37-40.

An outbreak of pseudotuberculosis in a small colony of guinea pigs is described. In this outbreak there appears to be no resemblance to the usually accepted progress and pattern of the disease. A suggestion has been put forward that a latent form of infection can exist. - *Authors' summary.*

PARASITIC DISEASES

343. Ewing, S. A. (College of Veterinary Medicine, Oklahoma State University Stillwater, Oklahoma 74074). 1966. *Evaluation of methods used to detect Babesia canis infections in dogs*. Cornell Vet. 56: 211-220.

In contrast to information in the literature, venous blood was determined to be more suitable than capillary blood for making confirmatory diagnoses of canine babesiosis; statistical evidence proved, however, that if 100,000 or more erythrocytes are examined in diagnostic procedures, either capillary blood or venous blood may be used. - *Author's summary*.

344. Miller, M. J. (3550 Cote des Neiges, Montreal 25, Quebec, Canada) and R. S. Bray. 1966. *Entamoeba histolytica infections in the chimpanzee (Pan satyrus)*. J. Parasitol. 52: 386-388.

Observations on *Entamoeba histolytica* infections in a laboratory colony of young chimpanzees are reported. In nature, the incidence appears to be low, but after coming in contact with sources of infection, and being confined to animal quarters, high infection rates with both large and small races of *E. histolytica* can build up rapidly. Infections usually persist for long periods of time in the absence of any evidence of tissue invasion. Nevertheless, serious and fatal amebic disease may occur. Two cases are described, one dying of amebic ulcerative colitis and the other of amebic liver and lung abscesses. The host-parasite relationships of *E. histolytica* in chimpanzees and in man appear to be similar and this suggests that the chimpanzee may prove to be a useful experimental host for studying the pathogenesis of amebic disease in man. - *Authors' summary*.

345. Bucher, G. E. (Research Institute, Canada Department of Agriculture, Belleville, Ontario, Canada). 1966. *Schizogregarine infection in grasshoppers*. J. Invertebrate Pathol. 8: 127-129.

Schizogregarine (neogregarine) infection was observed in a collection of 427 grasshoppers near Lethbridge, Alberta, in 1960. Though there was no evidence of disease or of excessive mortality in the field, an unusually high proportion (23%) of the insects died during air transit to Belleville, Ontario. The dead insects were examined microbiologically. The survivors were isolated and observed for morbidity or other evidence of infection. The collection consisted of 12% *Melanoplus bivittatus* and 88% *M. bilituratus*. About 15% of the *M. bilituratus* and 10% of the *M. bivittatus* adults were infected. Sex did not significantly influence the rate of infection. However, schizogregarine infection was not the principal cause of mortality. Most deaths were caused by infection with a white strain of the bacterium, *Serratia marcescens*. At death the typically infected grasshopper resembled one that had been starved. The gut lacked food particles and the fat body contained few fat globules. Attempts at artificially transmitting the infection were unsuccessful. - R. J. Flynn.

346. Strauss, J. M. (Institute for Medical Research, Kuala Lumpur, Malaysia) and D. Heyneman. 1966. *Fatal ectopic fascioliasis in a guinea pig breeding colony from Malacca*. J. Parasitol. 52: 413.

Six of a group of 138 guinea pigs obtained from several suppliers in Malacca, southwestern Malaya, died or were killed after developing posterior paresis. All but one of them contained one or more fully developed *Fasciola gigantica* in various ectopic areas of the pelvic region. Extensive damage was observed in the liver, kidneys, lungs, body wall musculature and hind limb musculature. Hemorrhage and characteristic coffee-ground brown fluid in fibrotic cysts was also found. - T. E. Fritz.

347. Cain, G. D. (Purdue University, Lafayette, Indiana 47907). 1966. *Helminth parasites of bats from Carlsbad Caverns, New Mexico*. J. Parasitol. 52: 351-357.

Of 14 juvenile and 18 mature Mexican free-tailed bats, 9.4% harbored a cestode and 31.2% harbored a nematode. Trematodes, of several different species, were found in 50% of the mature bats. - W. G. Keenan.

348. Nishimura, K. (University of Hawaii, Honolulu, Hawaii 96822). 1966. *Experimental studies on the chemotherapy of rat lungworm, Angiostrongylus cantonensis, in rats*. Chemotherapia 10: 164-175.

Studies were conducted to determine the value of bithionol, bithionol-S-oxide, fuadin, hetrazan, and thiabendazole against *Angiostrongylus cantonensis* infection in rats. In most cases, the drug was administered to rats on the 14th, 17th, and 21st day after infection and for five consecutive days. The following drugs were found ineffective: bithionol, bithionol-S-oxide, fuadin, and hetrazan. Thiabendazole, 14 days after infection and at the dosage rate of 200 mg/kg for five consecutive days, was effective in destroying all the parasites and preventing cerebral and lung pathology. - Author's summary modified.

349. Hamilton, J. M. (Veterinary School, University of Glasgow, Glasgow, Scotland). 1966. *Pulmonary arterial disease of the cat*. J. Comp. Pathol. 76: 133-145.

Disease of the pulmonary arterial vessels was found in 34.7% of 256 randomly selected cats. Association of the arteriopathy with age and sex was discounted. Histopathological examination of three groups of cats in which lesions of the pulmonary vasculature were present - (1) animals suffering from lungworm disease, (2) those without any other morbid condition, and (3) those affected by diseases other than lungworm - showed that the changes in the pulmonary arteries were almost identical. It was suggested, therefore, that a common etiologic factor was responsible. After discussion of the various factors which may have been of importance in the production of the arterial lesions, it was concluded, on the basis of the available evidence, that the most likely cause of hypertrophy and hyperplasia of the pulmonary arteries of the cat was infection with the lungworm, *Aelurostrongylus abstrusus*. - Author's summary modified.

350. Liu, S-K. (Animal Medical Center, New York, New York), K. M. Das, and R. J. Tashjian. 1966. *Adult Dirofilaria immitis in the arterial system of a dog*. J. Am. Vet. Med. Assoc. 148: 1501-1507.

One hundred sixty adult *Dirofilaria immitis* were found in a mature male hound-type dog with an otherwise normal heart. Parasites were in the left and right ventricles, left and right atria, anterior and posterior venae cavae, aorta, pulmonary artery, left and right external and internal iliac arteries, left and right femoral arteries, left and right popliteal arteries and testicular arteries. Villous intimal proliferation, endarteritis, and granulomatous lesions were observed in the abdominal aorta and in the iliac, femoral, popliteal, pulmonary, renal and testicular arteries. - *Authors' summary*.

351. Hirth, R. S. (University of Connecticut, Storrs, Connecticut 06268), H. W. Huizinga, and S. W. Nielsen. 1966. *Dirofilaria immitis in Connecticut dogs*. J. Am. Vet. Med. Assoc. 148: 1508-1516.

Dirofilaria immitis was found in 51 dogs in a combined hematologic and necropsy survey. In the former survey, the blood of 299 Connecticut dogs was examined for microfilariae of *Dirofilaria immitis*, and 23 dogs (7.7%) were positive, whereas larvae of *Dipetalonema reconditum* were seen in five samples (1.7%). Necropsy examination in a six-year period, of 28 dogs with heartworms revealed the following significant lesions: (1) villous endarteritis of large pulmonary arteries in ten; (2) medial hyperplasia of small muscular pulmonary arteries in seven; (3) fibrosis and hyalinization of Bowman's capsule in four; (4) pulmonary thrombosis in six, with hemorrhagic infarction in one; (5) marked hemosiderosis in the lungs, liver and kidneys of five; (6) centrilobular hepatic congestion and degeneration, often with necrosis, in 19. Of the infected dogs, 72% came from areas near the sea-coast or the Connecticut River. The lowlands around New Haven appeared to have an especially high prevalence. The larger breeds, particularly hunting and working dogs, which are more likely to be kenneled outside, had a significantly higher rate of infection. - *Authors' summary*.

352. Marquardt, W. C. (College of Veterinary Medicine, University of Illinois, Urbana, Illinois 61801) and W. E. Fabian. 1966. *The distribution in Illinois of filariids of dogs*. J. Parasitol. 52: 318-322.

The distribution of *Dirofilaria immitis* and *Dipetalonema reconditum* in the state of Illinois was studied by examining 331 blood samples over the two-year period, 1963-65. Blood samples were obtained from dogs residing in 42 of the 102 counties of Illinois. Dogs infected with *D. immitis* were found in 26 (61.9%) of the counties sampled and with *D. reconditum* in 17 (40.5%) of the counties sampled. A search of the Clinical Pathology Laboratory records revealed *D. immitis* in five and *D. reconditum* in three additional counties. A random sample of 55 dogs from the southern part of the state showed 29.1% infection with *D. immitis*. A random sample of 17 dogs from the northern part of the state showed no microfilariae. While *D. immitis* may occur throughout the state, it probably is more prevalent in the southern countries. Of the 331 dogs examined from all parts of

the state, 19.3% were infected with *D. immitis* and 3.6% with *D. reconditum*. However, the sample cannot be considered as random since the objective of the study was to find infected dogs. The infection rate with *D. immitis* remained below 5% in dogs younger than four years and then rose to between 14.7 and 26% for dogs up to 17 years of age. Infections with *D. reconditum* reached 12.5% in dogs one year old and then appeared to decline in prevalence in dogs older than six years. Published reports on the prevalence of filariids in dogs in the United States are reviewed and tabulated. - Authors' summary.

353. Colglazier, M. L. (Beltsville Parasitological Laboratory, Agricultural Research Service, Beltsville, Maryland 20705), F. D. Enzie, and R. H. Burtner. 1966. *The systemic action of methyridine against helminths, especially whipworms, in dogs*. Proc. Helminthol. Soc. Wash. D. C. 33: 40-41.

Limited tests with subcutaneous injections of methyridine, a systemic anthelmintic, indicate that this chemical may compare favorably with other trichuricides for dogs. A dosage of 150 mg/kg of body weight was completely effective against 348 *Trichuris* in four dogs; at 200 mg/kg, the drug removed all of 385 *Trichuris* from six dogs. The larger dosage was presumably fully effective also in five additional dogs that were not necropsied. Moderate activity was exhibited against *Ancylostoma* in limited trials at the 200-mg level. Anthelmintic action against *Toxocara*, *Taenia*, and *Dipylidium* was either negligible or too limited to permit even provisional interpretations of efficacy. Emesis, ataxia, soft feces, and acute irritation at the site of injection were evidenced at all dosage levels. These reactions, however, were transitory. - Authors' summary.

354. Holloway, H. L., Jr. (Roanoke College, Salem, Virginia 24153). 1966. *Helminths of rabbits and opossums at Mountain Lake, Virginia*. Bull. Wildlife Dis. Assoc. 2: 38-39.

A survey of helminths of rabbits and opossums was made at Mountain Lake, Virginia. Several new species of helminths are recorded for Virginia. - E. F. Staffeldt.

355. Pawlik, J. (Agricultural Research Institute, Canada Department of Agriculture, London, Ontario, Canada). 1966. *Control of the nematode Leidynea appendiculata (Leidy) (Nemata: Rhabditida: Thelastomatidae) in laboratory cultures of the American cockroach*. J. Econ. Entomol. 59: 468-469.

The nematode *Leidynea appendiculata*, an intestinal commensal of the American cockroach, *Periplaneta americana*, may be a problem in laboratories where cockroaches are reared. Because this nematode is closely related to the human pinworm, *Enterobius vermicularis*, some anthelmintics known to be effective against the human nematode were tested to determine their effectiveness for the cockroach nematode. One compound, Vanquin (bis-[6-dimethylamino-2-[2-(2,5-dimethyl-1-phenyl-3-pyrrolyl)-vinyl]-1-methylquolinium]-4,4'-methylene-bis-(3-hydroxy-2-naphthoate) was found to be effective. By using Vanquin and good sanitation, the author found that the nematode could be completely eliminated from cockroach cultures. - R. J. Flynn.

NONINFECTIOUS DISEASES

RESPIRATORY, CARDIOVASCULAR, GASTROINTESTINAL, NEUROENDOCRINOLOGIC DISEASES

358. Fuchs, U. (Pathologischen Institut der Karl-Marx-Universität, Leipzig, German Democratic Republic). 1966. *Kristalle in Blutmas- und Nekroseherden der Rattenlunge (Crystals in hemorrhagic and necrotic loci in the rat lung)*. Pathol. Microbiol. 29: 8-16.

Electron-optic studies of capillary changes after treatment with a cumarine-derivative revealed crystal formations in the rat lung. The crystals were tentatively identified as deriving from hemoglobin, based on their submicroscopic and staining characteristics and by comparison with similar crystal formations in the blood of untreated control animals. Spectrophotometric analyses gave results compatible with oxyhemoglobin, but in addition various degradation products appear to be present. - *Author's summary*.

359. Peacock, P. M. (Royal Maternity Hospital, Glasgow, Scotland) and P. R. Peacock. 1966. *Spontaneous and induced hyperplasia and neoplasia in the mouse lung*. Brit. J. Cancer 20: 127-133.

Induced and spontaneous pulmonary alveolar hyperplasia and neoplasia in young and old mice are compared. Most pulmonary tumors large enough to be visible to the naked eye appear to be subpleural but distinction should be drawn between those of subpleural and those of deeper origin. A classification based on anatomical site of origin and histological criteria is proposed. Subpleural hyperplasia and neoplasia are associated with the sites of normal subpleural lymph follicles and the communicating interstitial lymphatics of the lung which often show local engorgement with lymphocytes. Histologically similar lesions without lymphatic involvement occurring at sites other than subpleural are associated with terminal pulmonary arterioles. Hyperplastic and neoplastic lesions can be distinguished by the amount and arrangement of supporting elastica which is normal in hyperplastic and defective or absent in neoplastic lesions. It is suggested that the subpleural lesions are caused mainly by airborne carcinogens and the lesions at other sites by blood-borne carcinogens. - *Authors' summary*.

360. Roberts, W. C. (National Institutes of Health, Bethesda, Maryland 20014) and J. R. M. Innes. 1966. *Valvular cardiac disease in the monkey* (abstract). Federation Proc. 25: 533.

Among approximately 2,000 simian hearts examined at autopsy, two (each *Macaca mulatta*) demonstrated severe valvular malformations. In one the mitral valve was diffusely scarred, its orifice stenotic, the left atrium greatly dilated, and the right ventricle hypertrophied. The etiology of the mitral disease was not determined. The second monkey had severe aortic valvular stenosis and left ventricular hypertrophy. The stenosis was the result of an acute and chronic necrotizing inflammatory process which caused marked thickening of the aortic valvular cusps. The inflammation extended into the aortic valve "ring", anterior mitral leaflet, and adjacent myocardium and pericardium. The posterior mitral leaflet was normal. The etiology of the inflammatory process was not determined. - *Authors' summary modified*.

356. Hatziolos, B. C. (University of Maryland, College Park, Maryland 02742). 1966. *Cuterebra larva in the brain of a cat*. J. Am. Vet. Med. Assoc. 148: 787-793.

A dead cuterebrid larva, probably belonging to the species of either *Cuterebra americana* or *C. horripilum*, was found in the left amygdaloid nucleus between the fimbria of the hippocampus and the posterior horn of the lateral ventricle of a cat. It had produced focal encephalitis with a strong granulomatous inflammatory reaction. Clinically, the cat had a peculiar behavioral attitude and aggressiveness suggestive of rabies. - *Author's summary*.

357. Greve, J. H. (College of Veterinary Medicine, Iowa State University, Ames, Iowa 50010) and S. M. Gaafar. 1966. *Natural transmission of Demodex canis in dogs*. J. Am. Vet. Med. Assoc. 148: 1043-1045.

Eighty-three pups from 14 litters were examined to determine the time at which pups acquire *Demodex canis* Leydig. Skin and visceral samples from these pups were examined after maceration in 10% NaOH. Only one mite was identified in the skin and visceral samples from a total of 38 pups which had no dermal contact with their mothers (cesarean-derived or stillborn in intact fetal membranes). Pups having neonatal contact with their mothers harbored mites at first on the forequarters and usually within the first few days of life. Pups whelped naturally from bitches either with or without clinical evidence of demodicidosis harbored mites, indicating that natural transmission of *D. canis* occurred neonatally by contact with the bitch. - *Authors' summary*.

361. Strong, J. P. (Louisiana State University School of Medicine, New Orleans, Louisiana 70112), D. Kritchevsky, and R. D. Martinez. 1966. *Sudanophilic aortic lesions in chimpanzees*. Arch. Pathol. 81: 544-547.

Aortas of 14 chimpanzees were examined and sudanophilic intimal lesions were found in 11 of them. The observed intimal lesions closely resembled early human fatty streaks. Since chimpanzees have also been reported to be susceptible to hypercholesterolemia, they would seem to be a suitable experimental primate for studying mechanisms of development of hypercholesterolemia and arterial lesions. A baseline study of the prevalence and extent of lesions in the wild chimpanzee is needed. Whether these lesions were naturally occurring or induced during their period of confinement of up to 12 months cannot be determined. While no attempt was made to produce lesions, the chimpanzees, during confinement, were fed a diet very different from the one they would obtain in their natural habitat. - T. E. Fritz.

362. Upton, A. C. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830), J. W. Conklin, and W. D. Gude. 1966. *Polyarteritis in aging RF mice* (abstract). Federation Proc. 25: 665.

Polyarteritis of the aorta and major arteries has been noted with unexpectedly high frequency in aging male and female noninbred RF mice of the Oak Ridge subline. The incidence and age distribution of the lesions are not known precisely, but the disease has been observed in up to 20% of the mice older than nine months of age that have been examined histologically in various experiments. It has not been noted in younger mice, nor has its incidence been detectably affected by whole-body irradiation early in life. The lesion is characterized in its acute stages by infiltration of polymorphonuclear and mononuclear cells throughout the wall of the affected vessel, with fibrinoid necrosis of the media. Aneurismal dilation, rupture, and fibrosis of the affected vessel have been noted in the later stages. Sites of predilection include the proximal aorta and the coronary, renal, uterine, ovarian and splenic arteries. - Authors' summary modified.

363. Rosenberg, H. M. (University of Illinois College of Dentistry, Chicago, Illinois 60612), C. E. Rehfeld, and T. E. Emmerring. 1966. *A method for the epidemiologic assessment of periodontal health-disease state in a beagle hound colony*. J. Periodontol. 37: 208-213.

The incidence of sequence of periodontal disease observed in a control beagle colony at Argonne National Laboratory are described. Calculus deposition in this study was observed as early as nine months of age. It occurs first on the surfaces of the teeth which are in close proximity to the opening of the ducts of the parotid glands. Calcified deposits are preceded by an accumulation of stain and soft debris which is an indication that these areas of teeth at this age are no longer self cleansing. During the period from 16 to 26 months, calculus formation increases and becomes heavier, more textured in appearance and more difficult to separate from the teeth. Approximately 95% of the observed animals could be considered to have heavy calculus deposits after 26 months of age. After 26 months of age, the character of the gingival inflammation becomes severe with accompanying pocket formation, supuration, and acute abscess formation. Because of clinical similarity of periodontal disease in the observed beagle colony and a human population, the authors suggest that this animal is an excellent model for studies of periodontal disease. - R. J. Flynn.

364. Kimbrough, R. (Communicable Disease Center, Atlanta, Georgia 30333). 1966. *Spontaneous malignant gastric tumor in a rhesus monkey (Macaca mulatta)*. Arch. Pathol. 81: 343-346.

A microscopically unusual, malignant neoplasm of the stomach in an old female rhesus monkey is reported. It was concluded that the tumor was a carcinoma in which highly anaplastic cellular elements were intermixed with well-differentiated adenocarcinoma cells. Much stromal proliferation characteristic of a scirrhous carcinoma was also present. The tumor was large, had invaded the stomach wall, and showed all criteria of malignancy, yet there were no metastases. Although the monkey had been previously used in studies on pesticide toxicity and poliomyelitis, the author felt that the tumor had developed spontaneously. - T. E. Fritz.

365. Sinnhuber, R. O. (Oregon State University, Corvallis, Oregon 97331), J. H. Wales, and D. J. Lee. 1966. *Cyclopropenoids, co-carcinogens for aflatoxin-induced hepatoma in trout* (abstract). Federation Proc. 25: 555.

Cyclopropenoid fatty acids, as *Sterculia foetida* oil, were investigated as possible promoting factors in aflatoxin-induced trout hepatoma. A purified ration containing 0.04% *S. foetida* oil (200 ppm cyclopropene function) and 4 ppb aflatoxin B₁ caused severe liver damage in trout fry after three months and an 83% incidence of gross liver tumors within six months. Trout receiving 4 ppb aflatoxin B₁ in a purified diet showed only slight microscopic liver damage after six months. These results suggest that cyclopropenoid fatty acids are powerful co-carcinogens when present in rainbow trout rations containing aflatoxin. - Authors' summary modified.

366. Tufts, J. M. (Purina Animal Pathology Laboratory, St. Louis, Missouri 63102). 1966. *Unidentified rabbit problem - hemorrhagic colitis*. Lab. Animal Digest 2: 16-17.

A disease of undetermined etiology characterized by the sudden onset of profuse diarrhea with death in 24 to 48 hours is described. Commonly, the only lesion is a hemorrhagic colitis, but in some instances there are also small focal areas of necrosis in the liver and a mild ascites. Attempts to isolate bacterial and viral etiologic agents have had inconsistent results. Some rabbit users have reported success in controlling the problem by feeding cultures of *Lactobacillus acidophilus*. The author suggests that an enterotoxemia may be the cause. - T. E. Fritz.

367. Janigan, D. T. (Dalhousie University Medical School, Halifax, Nova Scotia, Canada) and R. L. Druet. 1966. *Experimental amyloidosis: role of antigenicity and rapid induction*. Am. J. Pathol. 48: 1013-1025.

Although amyloidosis is often considered to be the result of, or related to an immunologic response, the conditions necessary for production of amyloid have not been established. Using a model previously established for the reproducible induction of amyloidosis in C57BL/10J mice the authors have shown relationships between antigenicity and the rate of induction.

The amyloidogenic properties of various soluble proteins showed that increased antigenicity was a sufficient condition to convert (1) a non-amyloidogenic protein (gelatin) into an amyloidogenic protein (azo-gelatin); (2) a weak amyloidogenic protein (bovine serum albumen) into a strong amyloidogenic protein (azo-albumen); and (3) a strong amyloidogenic protein (casein) into an even more potent amyloidogenic protein (azo-casein). Conversely, loss of antigenicity through loss of molecular size contributed an adequate condition to convert amyloidogenic proteins (casein and azo-casein) into nonamyloidogenic materials (casein and azo-casein hydrolysates). Throughout the study, progressive increases in antigenicity were associated with progressive decreases in amyloid induction times which could be ranked in the following decreasing order: azo-gelatin, 28 to 32 days> casein, 22 days>azo-albumen, 20 days>azo-casein, ten days>and with large amounts of azo-casein, six to eight days. The results are discussed in terms of the role of antigenicity in the experimental induction of amyloidosis and possible significance of the short induction times in relationship to immunologic tolerance. - *Authors' summary modified.*

368. Apffel, C. A. (Pondville Hospital, Walpole, Massachusetts 02081), B. G. Arnason, C. W. Twinam, and C. A. Harris. 1966. *Recovery with immunity after serial tapping of transplantable mouse ascites tumours.* Brit. J. Cancer 20: 122-126.

When mice bearing transplantable ascitic tumors were treated by daily withdrawal of ascitic fluid they recovered completely. Recovered animals were immune to the original tumor on subsequent challenge. They also had extensive cross immunity to other ascitic tumors. Evidence is presented that cell-free ascitic fluid is rich in tumor antigen and that its removal by tapping, rather than removal of the tumor cells themselves, is the crucial factor in the immunity achieved. - *Authors' summary.*

369. Streett, C. S. (U. S. Army Research Laboratories, Edgewood Arsenal, Maryland 21010) and B. A. Herrero. 1966. *Diabetes mellitus, cirrhosis, duodenal ulcer and neoplasms in a dog.* J. Am. Vet. Med. Assoc. 148: 1382-1386.

Diabetes mellitus in a 14-year-old male fox terrier was accompanied by a large array of lesions, including fatty cirrhosis of the liver, pancreatitis, chronic nephritis, leiomyomas of the stomach, duodenal ulcer, testicular seminoma, chronic valvular disease of the heart, prostatic hyperplasia, pituitary chromophobe adenoma, and adrenal cortical hyperplasia. All tissues were examined by light microscopy, and the kidneys and eyes were studied by electron microscopy. - *Authors' summary.*

370. Carpenter, M. B. (College of Physicians and Surgeons, Columbia University, New York, New York 10032) and N. L. Strominger. 1966. *Corticostriate encephalitis and paraballism in the monkey.* Archiv. Neurol. 14: 241-253.

Physiologic and pathologic observations of a rhesus monkey with bilateral necrotizing lesions involving the neostriatum, the external medullary lamina of the globus pallidus, the thalamus and the temporal lobes

are described. These lesions, which appeared to be a consequence of a spontaneous encephalitis, probably of viral etiology, were associated with a large amplitude, forceful and persistent choreoid activity involving all extremities and the axial musculature. - *Authors' summary modified.*

371. Fox, M. W. (Galesburg State Research Hospital, Galesburg, Illinois 61401). 1966. *A syndrome in the dog resembling human infantile autism*. J. Am. Vet. Med. Assoc. 148: 1387-1390.

The characteristics and possible causes of autism are reviewed and the results of a recent study are discussed. In this study, behavioral and electroencephalographic analyses of pups raised in social isolation for a short time at the onset of the critical period of socialization (four to five weeks of age) showed characteristics suggestive of autism in human infants. - *R. J. Flynn.*

GENITOURINARY, MUSCULOSKELETAL, CUTANEOUS AND OTHER DISEASES

372. Manaligod, J. R. (University of Illinois, College of Medicine, Chicago, Illinois 60612), F. Miyasato, V. E. Pollak, and C. L. Pirani. 1966. *Nephritis in NZB and (NZB x NZW) F₁ hybrids* (abstract). Federation Proc. 25: 238.

The renal histologic and electronmicroscopic changes were studied in 53 NZB mice and 30 (NZB x NZW) F₁ hybrids. NZB mice developed a Coombs' positive hemolytic anemia and few had lupus erythematosus and antinuclear factors. The hybrids rarely had Coombs' positive tests but almost all eventually developed lupus erythematosus and antinuclear factors and a florid renal disease. Mice of both strains had renal lesions similar to those of human lupus nephritis. In the pure strain, the changes were milder and in most instances were diagnosed as glomerulitis. In the hybrid strain, severe glomerulonephritis occurred in all mice over 34 weeks of age. - *Authors' summary modified.*

373. Epstein, S. S. (Children's Cancer Research Foundation, Boston, Massachusetts 02115) and S. R. Joshi. 1966. *Obstructive renal failure in random-bred Swiss mice* (abstract). Federation Proc. 25: 237.

Obstructive renal failure, in association with polydipsia and polyuria, has been previously reported in inbred male STR and SWN mice. A similar syndrome has been recently observed in the course of carcinogenicity testing with randombred neonatal Swiss mice. This syndrome, occurring only in males, was characterized by perineal ulceration, urethral plugging, bladder distension, bilateral hydronephrosis and uremia. In general, both the incidence and rate of development of obstructive renal failure were increased in various unrelated treatment groups as compared with appropriate controls. The overall incidence ranged from 15-75%, with a mean age at death of 36 weeks. While the pathogenesis of this syndrome is, as yet, obscure, it is considered unlikely that perineal ulceration and urethral obstruction by plugs, either individually or in combination, are the sole etiologic determinants. - *Authors' summary.*

374. Lalich, J. J. (University of Wisconsin Medical School, Madison, Wisconsin 54306). 1966. *Experimentally induced uracil urolithiasis in rats*. J. Urol. 95: 83-86.

Diets that contained 20-30 g of uracil per kg of diet were fed to weanling Sprague-Dawley rats up to 54 days. Minimal to moderate suppression in weight gain occurred in the uracil-fed rats. Calculi in the bladder, the ureters or the renal pelvis were encountered in a majority of the uracil fed rats. Chemicals resembling uracil such as barbituric acid, hydantoin and cytosine when fed at 20 g/kg diet did not produce calculi. - *Author's summary*.

375. Hasholt, J. (Veterinary Hospital, Emdrup, Copenhagen, Denmark). 1966. *Diseases of the female reproductive organs of pet birds*. J. Small Animal Pract. 7: 313-320.

During the period 1960-1961, 1819 birds were received for treatment at the Veterinary Hospital at Emdrup, Copenhagen. Of these, 148 were treated for diseases of the reproductive organs (eight male and 140 female). The signs and treatment of ovarian cysts and tumors, egg-binding, prolapse of the oviduct and salpingitis are described. Cysts and tumors were observed in 22 cases, and of these 13 were cured; egg-binding was observed in 36 cases and cured in 32; prolapse of the oviduct was observed in 38 cases and cured in 18; and salpingitis was observed in 42 cases and cured in 35. - *Author's summary modified*.

376. Johnson, D. C. (University of Kansas Medical School, Kansas City, Kansas 66103). 1966. *An ovulatory bilateral hermaphroditic rat*. Nature 210: 1287-1288.

A bilateral hermaphrodite, 30 days of age, is described. The testis was removed at 60 days of age and the animal killed at 120 days of age. A critical dissection and histologic examination of the genitals and endocrine glands was made. Because of the findings, the indispensibility of androgen for testicular differentiation and the determination of a male type of hypophyseal-hypothalamic axis is questioned. The significance of an embryonic inductor is discussed. - *T. E. Fritz*.

377. Sullivan, D. J. (AEC Agricultural Research Laboratory, University of Tennessee, Oak Ridge, Tennessee 37831) and H. P. Drobeck. 1966. *True hermaphroditism in a rhesus monkey*. Folia Primatol. 4: 309-317.

A case of true hermaphroditism in an apparently normal female monkey is described. Macroscopically, the reproductive organs of this animal were female, and female sex chromatin was observed in motor neurons of the cervical spinal cord. Histologically, both gonads were characterized by a central testicular portion that was surrounded by a rim of ovarian tissue. - *Authors' summary*.

378. Maruffo, C. A. (Oregon Regional Primate Research Center, Beaverton, Oregon 97005) and M. R. Malinow. 1966. *Seminoma in a howler monkey (Alouatta caraya)*. J. Pathol. Bacteriol. 91: 280-282.

There have been few reports of testicular tumors in monkeys and none previously in *Alouatta caraya*. The tumor described is the only testicular tumor found among 314 animals examined in northern Argentina. The features of the tumor were similar to those of seminomas in man. There were no metastases. - T. E. Fritz.

379. Van Wormer, R. L. (Bureau of Sport Fisheries and Wildlife, Jackrabbit Research Station, Twin Falls, Idaho 83301) and P. L. Hegdal. 1966. *Torticollis in a cottontail*. Bull. Wildlife Dis. Assoc. 2: 40.

A case of torticollis (wryneck) is reported in a cottontail rabbit (*Sylvilagus nuttallii*). - E. F. Staffeldt.

380. Sokoloff, L. (National Institutes of Health, Bethesda, Maryland 20014), Katharine C. Snell, and H. L. Stewart. 1966. *Degenerative joint disease in Rattus (Mastomys) natalensis* (abstract). Federation Proc. 25: 534.

Severe degenerative joint disease of diarthroses and intervertebral discs develops regularly in the African multimammate mouse during the second year of life. Virtually all peripheral articulations, with the exception of the hips, shoulders and sacroiliacs, are affected; but mostly the elbows and knees. Prolapse of degenerated disc tissue into the spinal canal occurs in multiple segments of the vertebral column. In older animals, this frequently results in transverse myelopathy and paraplegia. Among laboratory rodents, *R. natalensis* is the species, with the exception of a single strain of inbred mice (STR/IN), most susceptible to osteoarthritis. Guinea pigs and hamsters are also prone to the disorder, but various strains of rats and most mice are resistant to it. - Authors' summary modified.

381. Tjalma, R. A. (National Institutes of Health, Bethesda, Maryland 20014). 1966. *Canine bone sarcoma: estimation of relative risk as a function of body size*. J. Natl. Cancer Inst. 36: 1137-1150.

Larger canine breeds are subject to excess relative risk of primary bone sarcoma. Based on comparison of normal population samples and the 404 cases studied, the risk of bone sarcoma among giant dogs (over 80 lbs.) is estimated to be no less than 61 times the risk among small dogs (<20 lbs.), and possibly as high as 185 times the risk for small dogs. A preliminary indication of increased risk of cancer other than bone sarcoma among larger breeds complicates interpretation of bone sarcoma risk values; if the larger breeds are subject to a greater probability of clinical attention for all types of cancer, the actual risk of bone sarcoma among giant dogs may be as low as 29 times the risk among small dogs. Among giant dogs the risk of bone sarcoma is estimated to be no less than five, and possibly as high as 30, times the risk of cancer other than bone sarcoma. Study results indicate the excess risk of bone sarcoma is characteristic of the larger breeds as a group rather than of one or several particular breeds. - Author's summary.

382. Dunaway, P. B. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831) and G. E. Cosgrove. 1966. *A skin carcinoma in a cotton rat*. *Am. Midland Naturalist* 75: 535-537.

A skin neoplasm in the mammary region of a female cotton rat, *Sigmodon hispidus*, from a natural population was noted during pregnancy. A squamous cell carcinoma was diagnosed histologically 18 days after parturition. There was an associated abscess and marked leukocytosis. The authors believe this to be the first report of a skin carcinoma in *S. hispidus*. - *Authors' summary modified*.

383. Lafeber, T. J. (7278 Milwaukee Avenue, Niles, Illinois 60648). 1966. *Feather problems in caged birds: molting*. *Animal Hospital* 2: 122-129.

The feathers of an average parakeet comprise 8-10% of its total weight and the number of feathers is between two and three thousand. Therefore molting and replacement of feathers can impose a severe strain upon the bird and plays an integral part in its well-being. Feather-growth processes are reviewed and the stress of molting is emphasized. The factors that initiate and influence molting, the molting process, different types of molting and experimentally induced molting are described and discussed. - *C. M. Poole*.

384. Luntz, M. H. (University of Witwatersrand Medical School, Johannesburg, South Africa). 1966. *Experimental glaucoma in the rabbit*. *Am. J. Ophthalmol.* 61: 665-680.

A method of producing primary glaucoma in rabbits by means of the sub-conjunctival injection of phenol is described. In nine out of ten rabbits treated in this way, a chronic glaucoma resulted. The effects of pilocarpine drops and acetazolamide were studied in two rabbits, and of irus inclusion operations on four eyes, two control and two treated. Aqueous outflow and inflow studies suggested that the inflow of aqueous was reduced and the resistance to outflow increased in "treated" eyes with raised intraocular pressure. - *Author's summary modified*.

385. T-W-Fiennes, R. N. (Zoological Society of London, Regent's Park, London, N.W.1, England). 1966. *The Zoological Society of London: report of the Society's pathologist for the year 1963*. *J. Zool.* 148: 341-362.

An account is given of autopsy examinations of stock at Regent's Park for the year 1963. Mammalia, Aves, Reptilia, and Amphibia are included. Case histories, longevity records and statistical analyses of all causes of death are given. - *E. F. Staffeldt*.

386. T-W-Fiennes, R. N. (Zoological Society of London, Regent's Park, London, N.W.1, England). 1966. *The Zoological Society of London: report of the Society's pathologist for the year 1964*. J. Zool. 148: 363-380.

An account is given of autopsy examinations of stock at Regent's Park for the year 1964. Mammalia, Aves and Reptilia are included. Case histories and longevity records are given. Statistical analyses of all causes of death are given in tables. Various research problems studied during the year are briefly described. - *Author's summary modified.*

ZONOSSES

387. Anonymous. 1966. *B virus encephalomyelitis*. Brit. Med. J. 1(5492): 878.

An account is given of the history of B virus, its clinical and pathologic features in monkeys and man, the epizootiology of the disease in monkeys, and an evaluation of the risks of exposure in man. - T. E. Fritz.

388. Perkins, F. T. (Medical Research Council Laboratories, Hampstead, London, England) and E. G. Hartley. 1966. *Precautions against B virus infection*. Brit. Med. J. 1(5492): 899-901.

Although the risk of infection of man with B virus as a result of the handling of monkeys or monkey tissues is slight, the disease is important because the infection is generally fatal. Precautions in the observation, handling and housing of monkeys to minimize the possibility of transmitting the virus to man are discussed. Protective clothing, methods of disinfection of equipment, disposal of contaminated specimens and action to be taken in case of exposure are described. - T. E. Fritz.

389. Sumner-Smith, G. (Bristol University, Bristol, England). 1966. *B virus in association with a monkey colony at a department of psychology*. Lab. Primate Newsletter 5: 1-4.

The author reports on a human illness and death that occurred following a minor bite by a male vervet monkey (*Cercopithecus aethiops*). Monkey B virus was suspected as the cause of death, however, no virus could be recovered from the human patient or suspect vervet monkey. Serologic determinations made on the suspect monkey serum revealed a high neutralization titer for both *Herpesvirus simplex* and *H. simiae*. The human patient's serum showed virtually no neutralization of *H. simplex* but had a markedly high titer for *H. simiae* that increased as the disease progressed. The points are made (1) that while primary screening for B virus may be carried out by testing for *H. simplex* it is not always possible to produce *H. simplex* neutralization if the B virus titer is very weak, and (2) that the poor antigen-producing stimulus of B virus is once again demonstrated. - C. M. Poole.

390. Benda, R. (Military Institute of Hygiene, Epidemiology and Microbiology, Prague, Czechoslovakia), O. Procházka, L. Cerva, F. Rehn, H. Dubanská, and V. Hronovský. 1966. *Demonstration of B virus (Herpesvirus simiae) by direct fluorescent antibody technique*. Acta Virol. 10: 149-154.

A direct fluorescent antibody technique for demonstration of B virus was elaborated using the globulin fractions of immune rabbit or sheep serum conjugated with fluorescein isothiocyanate. The high quality of labelled antibodies was proved by staining of infected cultured cells, and using impression smears from brains of intracerebrally infected mice. The distribution of the virus in mouse brain cells and the development of the infection was also investigated by examining frozen sections. The

results indicate that labelled sheep gamma-globulin is most suitable for the diagnosis and experimental study of B virus. - *Authors' summary modified.*

391. Benda, R. (Military Institute of Hygiene, Epidemiology and Microbiology, Prague, Czechoslovakia). 1966. *Active immunization against infection caused by B virus (Herpes-virus simiae)*. Hyg. Epidemiol. Microbiol. Immunol. 10: 105-108.

Hull's formalin-treated vaccine was shown to provide protection against inhalation infection with B virus in rabbits. The degree of protection was somewhat lower than for intracutaneous infection. On the basis of the results it was concluded that the vaccine can probably be regarded as a means of protection against wound infection, as well as against inhalation infection of human beings at risk (keepers and laboratory workers in contact with monkeys). - *Author's summary.*

392. Sulkin, S. E. (Southwestern Medical School, University of Texas, Dallas, Texas), Ruth A. Sims, and Rae Allen. 1966. *Isolation of St. Louis encephalitis virus from bats (Tadarida b. mexicana) in Texas*. Science 152: 223-225.

A strain of St. Louis encephalitis virus has been isolated from Mexican free-tailed bats (*Tadarida b. mexicana*) collected at the time of an outbreak of encephalitis in Texas in 1964. - *Authors' summary.*

393. Kozuch, O. (Czechoslovakian Academy of Sciences, Bratislava, Czechoslovakia), I. Grulich, J. Nosek, and P. Albrecht. 1966. *Isolation of tick-borne encephalitis virus from the blood of the mole (Talpa europaea) in a natural focus of infection*. Acta Virol. 10: 84.

Virus isolation experiments were carried out on moles trapped in a natural focus of tick-borne encephalitis. Blood and brain samples were surveyed for the presence of the virus. Of 46 samples cultured, seven positive isolations of the virus were obtained in parallel in suckling mice and chick embryo cell cultures. - *T. E. Fritz.*

394. Baum, S. G. (National Institutes of Health, Bethesda, Maryland 20014), A. M. Lewis, Jr., W. P. Rowe, and R. J. Huebner. 1966. *Epidemic nonmeningitic lymphocytic-choriomeningitis-virus infection*. New Engl. J. Med. 274: 934-936.

Ten cases of nonmeningitic illness due to the virus of lymphocytic choriomeningitis occurred in laboratory personnel exposed to infected hamsters or fomites. The disease generally manifested itself as a severe grippé-like illness lasting for one to three weeks. Acute manifestations included severe headache, fever, arthralgia, anorexia and malaise. Leukopenia was present in all patients examined, and thrombocytopenia in one. Orchitis, arthritis and alopecia occurred as sequelae in a number of cases, but meningitis was seen in none. The disease was nonfatal and self-limiting in all cases. - *Authors' summary modified.*

395. Davenport, F. M. (Medical School, University of Michigan, Ann Arbor, Michigan 48104), A. V. Hennessy, N. Christopher, and C. K. Smith. 1966. *A common source multi-household outbreak of chimpanzee-associated hepatitis in humans*. Amer. J. Epidemiol. 83: 146-151.

An episode of chimpanzee-associated hepatitis involving five human cases in four households is described. A ten-month-old male chimpanzee was the source of infection. Of eight persons who handled the animal, five developed infectious hepatitis. Of the three who remained well, one had experienced jaundice at an earlier time. Four of the five human cases had contact with the source chimpanzee only during a two-day interval. The maximum possible incubation periods for these persons were: 25, 26, 28 and 36 days. Of the five cases, one was subclinical and symptomatic for only a few days; the remaining four had mild, but typical infectious hepatitis. Gamma globulin was given to all household contacts; no secondary human cases were observed. - *Authors' summary*.

396. Boulger, L. R. (Medical Research Council Laboratories, Hampstead, London, N.W. 3, England). 1966. *Natural rabies in a laboratory monkey*. Lancet 1(7444): 941-943.

A report is given of a natural case of rabies in an adult female rhesus monkey, one of a consignment received by air from India. The monkey became ill 47 days after arrival, was off its feed, cowered in the back of its cage, and bit its fingers and hands. Laboratory diagnosis of rabies was made on the evidence of cytoplasmic inclusion bodies in the neurones of the hippocampus and the isolation of virus from the brain and submandibular salivary glands. The virus was identified as a strain of rabies virus by the serum-neutralization test, and its viscerotropism confirmed it to be a strain of wild rabies virus. This appears to be the first recorded, confirmed case, of natural rabies in a laboratory monkey. - C. M. Poole.

397. Diesch, S. L. (College of Medicine, University of Iowa, Iowa City, Iowa 52240), W. F. McCulloch, and J. L. Braun. 1966. *Isolation of Leptospira grippotyphosa from a western harvest mouse in Iowa*. Bull. Wildlife Dis. Assoc. 2: 15-17.

The occurrence of *Leptospira grippotyphosa* in a western harvest mouse is reported. This is the first time this organism has been isolated from this species. - E. F. Staffeldt.

398. Hubbert, W. T. (San Francisco Field Station, Communicable Disease Center, San Francisco, California) and M. N. Rosen. 1966. *Isolation of Leptospira ballum from a western harvest mouse (Reithrodontomys megalotis)*. Bull. Wildlife Dis. Assoc. 2: 18-19.

From April 27 to May 12, 1965, 29 mammals representing ten species were trapped in Butte County, California, and examined for *Leptospira*. These included: seven adult male California ground squirrels (*Citellus beecheyi*), five adult male jackrabbits (*Lepus californicus*), two adult female and two adult male feral cats (*Felis cattus*), two adult male striped skunks (*Mephitis*

mephitis), one adult male red fox (*Vulpes fulva*), one adult male Norway rat (*Rattus norvegicus*), one adult female California vole (*Microtus californicus*), one adult female and two adult male house mice (*Mus musculus*), two adult male rabbits (*Sylvilagus* sp.), and one adult male western harvest mouse (*Reithrodontomys megalotis*). Only the cultures from the *Reithrodontomys* yielded leptospires. The serotype of the isolate was determined to be *Leptospira ballum*. This is the first record of the isolation of *L. ballum* from the western harvest mouse. - E. F. Staffeldt.

399. Babudieri, B. (WHO/FAO Reference Laboratory for Leptospirosis, Istituto Superiore di Sanità, Laboratori di Microbiologi, Rome, Italy) and G. Ghysels. 1966. *Etude de quelques souches de leptospires isolées de hérissons (Erinaceus europaeus L.) en Belgique (A study of some strains of leptospires isolated from hedgehogs (Erinaceus europaeus L.) in Belgium)*. Ann. Inst. Pasteur. 110: 627-634.

Attempts at isolation of *Leptospira* from urine and kidneys of 44 hedgehogs captured in Belgium were carried out. In 12 cases it was possible to isolate such strains. All of these strains belong to the *australis* group and they are narrowly related to the *australis* serotype. However, absorption tests proved that one of them, at least, strain And 11, belongs to a new serotype. The relationship between this strain and the strain Lora is discussed. The authors suggest that the latter and similar strains should be classed into a new serotype, *lora*. - Authors' summary.

400. Hubbert, W. T. (Communicable Disease Center Activities, San Francisco Field Station, San Francisco, California) and E. B. Shotts. 1966. *Leptospirosis in kennel dogs*. J. Am. Vet. Med. Assoc. 148: 1152-1159.

A kennel of 19 dogs was studied for a period of ten months following a fatal illness suggestive of leptospirosis in a five-month-old bitch. Isolation attempts on urine collected by aspiration of the bladder revealed that ten of the 19 dogs were shedding *Leptospira canicola*. None of the ten dogs had a history of previous illness suggestive of leptospirosis, nor were any clinical signs of renal disease detected during this study. None of the persons in contact with infected dogs had evidence of clinical leptospirosis or serologic evidence of infection with leptospires. Oxytetracycline given orally at a dose of 12.5 mg/lb (27.5 mg/kg) of body weight twice daily for five days failed to eliminate canine shedding of *L. canicola*. Oleandomycin given orally at a dose of 25.0 mg/lb (55.0 mg/kg) of body weight twice daily for five days did not eliminate the shedder state. There was suggestive evidence that dihydrostreptomycin given intramuscularly at a dose of 20.0 mg/lb (44.0 mg/kg) twice daily for five days may be effective. However, further supportive evidence is needed. All three antibiotics in the dosages given did eliminate viable leptospires from the urine during the period of treatment and for a variable period after treatment. To ascertain the effectiveness of a drug, periodic examination of shedders for several weeks after treatment was found necessary. - Authors' summary modified.

401. Minette, H. P. (Hawaii State Department of Health, Hilo, Hawaii 96720). 1966. *Leptospirosis in primates other than man*. Am. J. Trop. Med. Hyg. 15: 190-198.

A serologic survey of 1420 sera representing 34 species of primates suggest that there is either very little leptospiral infection in these animals in nature, or that their antibodies formed in response to leptospiral infection do not persist for any appreciable length of time. Fourteen of the 19 serologic reactors among baboons (*Papio* sp.), nine of the 48 reactors among chimpanzees (*Pan troglodytes*), two of the three reactors among the patas monkeys (*Cercopithecus patas*) and the one reactor among the marmosets (*Oedipomidas oedipus*) showed antibodies agglutinating *Leptospira ballum*, a serotype not known to occur in the native habitat of these animals, but prevalent in the mouse in the United States. In addition, at least two of the *L. icterohemorrhagiae* infections in the group of chimpanzees examined are known to have occurred while the animals were in captivity; this serotype has also been demonstrated in the mouse and many other small mammals in the United States. All four of these primate species are known to catch and eat insects and small mammals. The absence of detectable leptospiral agglutinins in all except one of the small group of New World primates examined confirms the previous published and unpublished findings of other workers. To date, there is no evidence of leptospiral infections in nature among any of the New World primates. - Author's summary modified.

402. Gonzalez, A. B. (Tampa General Hospital, Tampa, Florida 33606). 1966. *Lactose-fermenting Salmonella*. J. Bacteriol. 91: 1661-1662.

A lactose fermenting strain of *Salmonella* was isolated from a case of fatal septicemia in man. The organism was tentatively identified as a strain of *Citrobacter freundii* but was subsequently identified as *S. tennessee*. It can be differentiated from *C. freundii* on the basis of decarboxylase reactions and serologic agglutinations. - P. C. Brennan.

403. Mann, P. H. (Mount Sinai Hospital, New York, New York 10029), G. Bjotvedt, and J. W. Winter. 1966. *Survey of poultry, dogs, cats, and monkeys for the presence of Salmonella and Cryptococcus neoformans*. Cornell Vet. 56: 195-199.

Salmonellae were isolated from the cecal contents and mesenteric lymph nodes of chickens, dogs and cats. No cryptococci were isolated from these same animals. Neither *Salmonella* nor *Cryptococcus neoformans* was recovered from monkeys. - Authors' summary.

404. McGill, R. C. (Northern Hospital, Dunfermline, Scotland), A. M. Martin, and P. N. Edmunds. 1966. *Rat-bite fever due to Streptobacillus moniliformis*. Brit. Med. J. 1(5497): 1213-1214.

Rat-bite fever can be caused by two different organisms, *Streptobacillus moniliformis* and *Spirillum minus*. Both organisms are transmitted to man by the bite of an infected rat or other rodent. The infection may also be acquired from contaminated food or milk. Before the introduction of antibiotics the illness was protracted, and a case has been described that lasted

17 years. It is a rare disease in Great Britain, most published reports coming from North America. This paper describes two cases of rat-bite fever due to *S. moniliformis* treated in this hospital within a period of eight months. - Authors' summary modified.

405. Quaife, R. A. (Public Health Laboratory, Portsmouth, Hampshire, England). 1966. *Human infection due to the hedgehog fungus, Trichophyton mentagrophytes var. erinacei*. J. Clin. Pathol. 19: 177-178.

Three human cases of skin infection caused by *Trichophyton mentagrophyte* var. *erinacei* are recorded. A review of work on the incidence and ecology in hedgehogs and as a source of human infection is given. It is suggested that a true increase in human infections is occurring. A description of the colonial and microscopic appearance of the fungus and their variance with other *T. mentagrophytes* varieties is discussed. The name *Trichophyton erinacei* is proposed as being taxonomically more correct. - Author's summary.

ZOOTECHNIQUES

ANESTHESIA, SURGERY, SURGICAL IMPLANTS

406. Rye, M. M. (Louisiana State University, New Orleans, Louisiana 70122) and S. T. Elder. 1966. *A suggestion concerning the anesthetization of the rat.* J. Exptl. Anal. Behavior 9: 243-244.

Anesthetization of the rat using chlorprothixene as a preanesthetic with pentobarbitol is described. In the authors' experience, use of this preanesthetic agent intraperitoneally 15 to 20 minutes before administration of pentobarbitol greatly reduced anesthetic deaths. A body-weight dosage chart is given for the combined use of the two drugs. The authors found this anesthetic combination satisfactory for use in rats with pulmonary disorders by decreasing the pentobarbitol dosage slightly. - R. W. Camden.

407. Schechter, P. J. (University of Chicago, Chicago, Illinois 60637) and L. J. Roth. 1966. *Transfer of thiopental across the rat placenta and its distribution in maternal and fetal tissues* (abstract). Federation Proc. 25: 531.

Whole body autoradiography and radioassay of selected tissue from 21 day old pregnant rats sacrificed from 30 seconds to two minutes following intravenous injection of an anesthetic dose of thiopental-2-C¹⁴ into the maternal circulation indicate a rapid redistribution of this drug out of the maternal blood stream into a variety of maternal tissues, principally liver, cerebral cortex, lung, kidney cortex and medulla, and myocardium. In marked contrast to the tissues of the mother, only trace amounts of radioactivity were present in any fetal tissue at these early times after injection. As the postinjection interval increases, the concentration of barbiturate in the fetal tissues increases; however, the concentration of thiopental in fetal brain never reaches that in maternal cerebral cortex at any time up to 30 minutes after injection. No metabolites of thiopental were found in either maternal tissues or in whole fetuses at any time during the first 30 minutes after injection. - Authors' summary.

408. Purchase, I. F. H. (National Nutrition Research Institute, C.S.I.R., P.O. Box 395, Pretoria, South Africa). 1966. *Cardiac arrhythmias occurring during halothane anaesthesia in cats.* Brit. J. Anaesthesia 38: 13-22.

The incidence of cardiac arrhythmias in cats during halothane anesthesia is high, and the arrhythmias observed during 37 periods of anesthesia have been classified into four types. The effect of the concentration of halothane, the blood pressure, the arterial blood gases and sensory stimulation on the occurrence of the ventricular extrasystoles with contradirectional interference are described. It is suggested that, under certain conditions, halothane may produce cardiac arrhythmias in cats through a direct action on the myocardium. - Author's summary.

409. Van Riper, D. C. (6571st Aeromedical Research Laboratory, Holloman Air Force Base, New Mexico 88330). 1966. *New preanesthetic possible cause of chimpanzee death*. Lab. Primate Newsletter 5: 11.

The author reports the limited use of a combination of fentanyl and droperidol (Innovar-Vet) in chimpanzees on an experimental basis and the death of one animal 15 minutes after injection, apparently from cardiac arrest. - C. M. Poole.

410. Graham-Jones, O. (Zoological Society of London, Regent's Park, London, N.W. 1, England). 1966. *The clinical approach to tumours in cage birds - III. Restraint and anaesthesia of small cage birds*. J. Small Animal Pract. 7: 231-239.

Some aspects of the restraint and anesthesia of birds, including small birds such as the budgerigar, are described together with some volatile, gaseous, and nonvolatile anesthetic drugs. Methods of induction of anesthesia and sites of injection are discussed. - *Author's summary*.

411. Ravitch, M. M. (University of Chicago Clinics, Chicago, Illinois 60637), A. Rivarola, and J. Van Grov. 1966. *Rapid creation of gastric pouches with the use of an automatic stapling instrument*. J. Surg. Res. 6: 64-65.

The authors describe a procedure in which satisfactory closure of cut ends of stomach and bowel in the dog is obtained by the application, in one step, of a double row of staggered stainless steel wire staples. This procedure offers a convenient and rapid way of constructing gastric pouches. - R. J. Flynn.

412. Khodadad, G. (22 Parcham Street, North Navab Avenue, Teheran, Iran) and W. M. Loughheed. 1966. *Stapling technique in segmental vein autografts and end-to-end anastomosis of small vessels in dogs*. J. Neurosurg. 24: 855-864.

The authors discussed the experience of others with various vascular stapling instruments and emphasized the important points in their stapling technique which utilizes the operating microscope. They described their results and pathologic findings in grafting and anastomosing 110 small arteries and veins in dogs. They also indicated the difficulties encountered in the intracranial application of the present vascular staplers and suggested the possible use of these instruments in the vessels of the neck. - *Authors' summary modified*.

413. Hopcroft, S. C. (Queen Elizabeth Hospital, Woodville, South Australia, Australia). 1966. *A technique for the simultaneous bilateral removal of the adrenal glands in guinea pigs, using a new type of safe anaesthetic.* Exptl. Med. Surg. 24: 12-19.

A reliable and quick method for the removal of both adrenal glands from a guinea pig in one operation is described. A method of anesthesia for guinea pigs is also described which is both safe and simple. - *Author's summary.*

414. Sato, M. (Hospital das Clínicas, São Paulo, Brazil) and S. Yoneda. 1966. *An efficient method for transauricular hypophysectomy in rats.* Acta Endocrinol. 51: 43-48.

A modification of the transauricular method of hypophysectomizing rats is described. This method differs from other methods in that, in this one, the perforation of the tympanic membrane is done visibly. - *R. J. Flynn.*

415. Vukelić, E. (School of Veterinary Medicine, University of Zagreb, Zagreb, Hungary). 1966. *A technique for experimental resection of the liver in dogs.* Zentr. Veterinarmed. Reihe A 13: 97-101.

Experimental lobectomy of the left lateral and medial liver lobes was carried out in 16 dogs and in two of them the caudate and part of the right lateral lobe were also removed at the same time. All resections were made without prior preparation of the liver tissue and vessels and were effected merely by ligating the root of the lobe or part of the lobe. The animals withstood the operation well and showed no serious postoperative effects. Anatomic and histologic studies showed that the technique caused no significant damage to the liver tissue left behind. - *Author's summary.*

416. Roth, J. G. (Oregon Regional Primate Research Center, Beaverton, Oregon 97005). 1966. *A method for attaching apparatus to the skull.* Electroencephalog. Clin. Neurophysiol. 20: 618-619.

A method is described for riveting electrical connectors and similar items to the skull. This technique has been used successfully in rhesus monkeys and is readily adaptable to other experimental animals. - *Author's summary.*

417. Sekiguchi, M. (Hôpital Paul-Brousse, Villejuif, Seine, France), Anne-Marie Méry, Colette Brézin, W.-E. Vaubel. 1966. *Une méthode simple et rapide de greffe de peau chez la souris (A simple and rapid method of skin grafting in the mouse).* Rev. Franc. Etudes Clin. Biol. 11: 203-205.

A simple and rapid technique of skin grafting in mice is described. A bed for the graft, about 7 mm in diameter, is prepared on the back by picking up a tent-shaped piece of skin with a small forceps and excising it with a scissors. A graft of similar size is cut and placed on the bed already prepared. The graft is protected with a single covering of a special rubber-coated gauze, stuck on the skin around the graft with a medical rubber adhesive. - *Authors' summary modified.*

418. Balner, H. (Radiobiological Institute TNO, Rijswijk Z. H., Netherlands). 1966. *Histocompatibility testing in primates*. *Vox Sanguinis* 11: 306-314.

The various methods of histocompatibility testing used by the author in testing monkeys, and a correlation of the results obtained with the outcome of grafting experiments, are described. - R. J. Flynn.

419. Kurtsin, I. T. (Institut Fiziologii im. I. P. Pavlova, AN-SSSR, Leningrad, U.S.S.R.) and V. K. Bolondinskii. 1966. *Operative procedure for resection of intestinal mucous membranes in chronic experiments with dogs* (in Russian). *Fiziol. Zh. SSSR* 52: 112-113.

A method is described for repeated sampling of the intestinal mucosa of the dog. The technique consists of resection of a portion of the duodenum preserving the mesentery. This resected portion is exteriorized and the abdominal wall sutured leaving only an opening for the passage of the mesentery. The piece of intestine, with mucous surface outward, is sutured to the subcutaneous tissue about 1-2 cm below the skin. After one to two weeks the mucosa regains its normal color and contracts normally. - C. M. Poole.

420. Papandrianos, D. (Colgate-Palmolive Research Center, Piscataway, New Jersey 08854), S. J. DeSalva, and S. Weiss. 1966. *Introduction of a sensitive probe for measuring physio-pharmacological changes in nasal cavity* (abstract). *Federation Proc.* 25: 502.

A method is described which permits the measurement of nasal congestion, respiratory effort and air flow in animals and humans. The essential part of the technique is the introduction of an especially designed probe, which can be inserted into the nostril of the subject without interfering with normal respiration. The probe consists of two metal or plastic cylinders of different diameters joined together. A cylindrical diaphragm constructed from thin natural rubber is placed over the two cylinders in such a way as to form an airtight tambour, which can be pressurized to fit snugly against the nasal tissues of the anterior nostril; thus, change in the internal diameter of the nostril can be recorded as pressure with a pressure transducer. Air flow is measured as a function of temperature changes between inspired and expired air using a sensitive thermistor located inside the larger cylinder of the probe. - *Authors' summary modified.*

421. Fleischer, H. (New York Medical College, New York, New York 11029), S. O. Burman, and W. L. Mersheimer. 1966. *A simple tubing holder for open heart surgery*. *Am. J. Surg.* 111: 605-606.

A simple tubing holder is described which can be easily and quickly fixed without sutures or towel clips to the sterile drapes covering an operating field. With it the tubing is held neatly and firmly without tangling, kinking, or compression. The device is a stainless steel flat rectangle measuring 10 by 5 by 1 cm. It has a steel spring clip near each of the corners. These clips secure the tubing holder to the sterile drapes.

The holder is lightweight, sturdy, unbreakable, easily cleaned, has no sharp or rough surfaces, and can be sterilized in an autoclave. -
R. J. Flynn.

422. Sheely, L. L. (Medical College of Georgia, Augusta, Georgia 30904) and P. P. Volpitto. 1966. *An inexpensive and satisfactory method for gas sterilization of anesthetic equipment*. *Anesthesiology* 27: 95-96.

A device for sterilizing anesthetic equipment, particularly rubber goods and endotracheal tubes, using ethylene oxide is described. The cost of the equipment is approximately \$100. The heart of the method is a commercially-available jar specially designed for the anerobic culturing of bacteria. The jar is connected to a vacuum line or pump and to a tank of ethylene oxide. After the material to be sterilized is placed in the jar the jar is evacuated and the air replaced by ethylene oxide. Objects left in this system for 18 hours are sterilized but are not damaged as they would be by repeated steam or liquid chemical sterilization. - T. E. Fritz.

423. Franklin, D. E. (Scripps Clinic Research Foundation, La Jolla, California 92037), N. W. Watson, K. E. Pierson, and R. L. Van Citters. 1966. *Technique for radio telemetry of blood-flow velocity from unrestrained animals*. *Am. J. Med. Electron.* 5: 24-28.

The circuitry and operation of a miniature telemetry blood flowmeter based on the Doppler principle is described. A plastic cylinder containing lead-zirconate sound-emitting and sensing crystals is clamped about a blood vessel to serve as the transducer. Five-megacycle sound is beamed from one crystal diagonally through the vessel wall into the blood stream. Part of the sound is backscattered from the blood and excites the second crystal. This signal is amplified and detected. The difference between transmitted and received frequencies, i.e., the Doppler shift of backscattered sound, is a measure of the blood velocity. The difference frequency modulates a VHF oscillator so that an FM/FM signal is radiated. When the signal is received remotely, the modulating frequency is recovered and analyzed in terms of frequency to determine blood velocity. The telemetry range is over 300 m. The flowmeter has been used for measurement of flow through the major vessels of various animals (dogs, seals, baboons, fish, alligators, birds, horses, and turtles) in both acute and chronic preparations. - *Authors' summary modified.*

424. Graf, H. (Universität Zürich, Zurich, Switzerzland) and A. Borbély. 1966. *Radiotelemetrische Körpertemperaturmessung bei Mäusen und Ratten (Radiotelemetric measurement of body temperature of mice and rats)*. *Experientia* 22: 339-340.

A simple and inexpensive radiotelemetric method for measurement of body temperature of small laboratory animals is described, and an example of a pharmacological application is given. - *Authors' summary.*

CARDIOVASCULAR SAMPLING, RECORDING AND INJECTION TECHNIQUES

425. Fujita, T. (Smith Kline and French Laboratories, Philadelphia, Pennsylvania) and D. H. Tedeschi. 1966. *A simple method for direct recording of arterial blood pressure of unanesthetized rats* (abstract). Federation Proc. 25: 594.

Rats weighing approximately 300 grams are anesthetized with ether and a small skin incision is made on the ventral surface of the base of the tail. The caudal artery is exposed and cannulated for a distance of 1-1.5 cm with polyethylene tubing (PE-50). The artery is tied to the cannula both distally and proximally from the point of cannulation and the wound is closed with the same sutures, thus tying the cannula to the skin. The cannula is filled with a heparin solution (1000 USP units/ml) and is heat sealed approximately 4-5 cm from the incision. For protection of the cannula during the overnight recovery period, the cannula is covered with an angled strip of aluminum which is fixed to the tail with adhesive tape. On the following day the now unanesthetized rats are placed in restraining devices of wire mesh. The tip of the cannula is trimmed off and PE-100 tubing from an electronic transducer is slipped over the cannula. This procedure is useful for short term experiments of one to two days and offers several advantages over the existing procedures for recording of blood pressure of unanesthetized rats.

- Authors' summary.

426. Dawson, A. (University of Washington, Seattle, Washington 98105), W. S. Kemper, R. L. Van Citters, and D. E. Franklin. 1966. *Vertebral artery flow in unrestrained dogs telemetered by Doppler ultrasonic flowmeter* (abstract). Federation Proc. 25: 700.

Flowmeter probes were placed around the vertebral artery proximal to its entry into the vertebral canal. At least two weeks after recovery from the operation, vertebral flow was telemetered from the unrestrained animal during spontaneous activities. Variations in vertebral flow were correlated with changes in thoracic aortic pressure and the flow in other vessels. Considerable changes in vertebral artery flow were seen, especially during excitement, the mean flow exceeding three times its resting level. Vertebral flow changed independently of aortic pressure and, on occasion, the changes were opposite in direction, implying changes in resistance of the vertebral artery bed. - Authors' summary.

427. Afonso, S. (University of Wisconsin Medical School, Madison, Wisconsin 53706) and C. W. Crumpton. 1966. *A thermodilution catheter flowmeter* (abstract). Federation Proc. 25: 699.

Heat produced by an electrically heated coil is distributed uniformly in the bloodstream by a stirrer and the temperature change measured downstream by a thermistor. The flowmeter consists of a four-turn coil of teflon insulated resistance wire of 7.5 ohm, connected to a 6 v battery, a stirring blade rotating between the coil and the thermistor (a steel wire flexible shaft transmits the rotational movement from an electric motor to the stirring blade) and a #32A50 thermistor. These components are mounted inside a wire cage, which is affixed to the tip of a cardiac catheter. The flexible shaft and the connection leads to the coil and to the

thermistor run inside the catheter. The flowmeter was tested for measurements of coronary sinus blood flow in seven open chest dogs. Comparison was made of 61 flow measurements by this method to values of respective, directly measured, flows. Extremes of comparison were +7.5 and -7.0% with an average variation of $\pm 3.3\%$. Good results were also obtained with this method in the measurements of coronary sinus blood flow in intact anesthetized dogs. The method described seems to provide a convenient and reliable means of measuring blood flow. - *Authors' summary.*

428. Dobson, A. (New York State Veterinary College, Cornell University, Ithaca, New York 14850), A. F. Sellers, and F. D. McLeod. 1966. *The appraisal in vivo of cuff-type blood flowmeters* (abstract). Federation Proc. 25: 699.

A T-cannula is inserted into the artery within the carotid loop in the neck of a sheep. A cuff-type probe is implanted on the same artery caudal to the loop. While occluding the artery cranial to the cannula, a known volume of blood can be passed through the probe via the side arm of the cannula. Thus repeated calibration with accurate flow zero is possible in the conscious sheep. Using the gated sine-wave electromagnetic flowmeter with commercially made probes, five implants gave useful observations over 9-19 days. The sensitivity *in vivo* was 67-93% of that *in vitro*. The systematic trends of sensitivity were not related to alterations in impedance between the sensing electrodes. Postmortem observations of sensitivity indicated a need for caution in the application of these data to the living animal. Stable blood flows of 130-420 ml/min were observed superimposed on zero errors from -100 to +370 ml/min. The insulation between magnet coils and ground of the probes deteriorated during implantation. - *Authors' summary.*

429. Schenk, W. G., Jr. (State University of New York, Buffalo, New York 14214), N. A. Delin, K. B. Kjartansson, and L. Pollock. 1966. *Cardio-vascular studies in the exercising animal: cardiac output, arterial pressure, cardiac work, and blood gas studies in the normal dog and the dog with heart block under maximal exercise. Methods and preliminary results.* J. Thoracic Cardiovascular Surg. 51: 854-863.

Techniques are described for the recording of ascending aorta flow, aortic pressure, and left ventricular work in the maximally exercising animal. Results obtained using these techniques with normal dogs and those with heart block are given. - R. J. Flynn.

430. Maistrello, I. (Dai Laboratori di Ricerca Ormonoterapia Richter S.p.A., Milan, Italy) and R. Matscher. 1966. *Determinazione della pressione arteriosa nel ratto non anestetizzato (Determination of the arterial pressure in the non-anesthetized rat).* Boll. Soc. Ital. Biol. Sper. 42: 137-139.

A method is described for determining the arterial pressure in small laboratory animals. The method utilizes an arterial catheter and records the results electrometrically on an oscillograph. - R. J. Flynn.

431. Cooperman, L. H. (National Institutes of Health, Bethesda, Maryland 20014) and P. E. G. Mann. 1966. *A simple method for direct arterial pressure measurement*. *Anesthesiology* 27: 93-94.

A device based on the "air-spring" principle and made from readily available materials is described. The device consists of an arterial cannula, some intravenous extension tubing and a three-way stopcock. The tubing is connected to the cannula and closed at the distal end. The proximal end of the tube contains saline, the distal end contains air. Changes in arterial pressure are reflected by variations in the length of the column of air in accordance with Boyle's law. The device can be calibrated using an aneroid or mercury manometer. - T. E. Fritz.

432. Ksents, S. M. (Kujbyshev University, Tomsk, U.S.S.R.) and Y. V. Schcherbakov. 1966. *New method for prolonged continuous recording of blood pressure in dogs during exercise* (in Russian). *Fiziol. Zh. SSSR* 52: 198-201.

A procedure was developed for the continuous recording of blood pressure in dogs running on a treadmill. A specially designed cannula is surgically implanted in the aorta. When recordings are to be made, a needle attached to a manometer is inserted directly into the aorta through the cannula. Not only does this procedure permit the prolonged and continuous recording of the systolic and diastolic blood pressure but it also permits the recording of the frequency of pulse oscillation, and it allows for the easy withdrawal of frequent blood samples. - R. J. Flynn.

433. Spooner, C. E. (UCLA Center for the Health Sciences, Los Angeles, California 90024) and W. D. Winters. 1966. *Intra-arterial blood pressure recording in the unrestrained chick during wakefulness and sleep*. *Arch. Intern. Pharmacodyn.* 161: 1-6.

This report describes a method of recording mean arterial blood pressure from the ischiatic artery of the unrestrained young chick. The mean arterial blood pressure of awake but quiet 6-14 day old chicks averaged 112 mm Hg. The chick blood pressure fluctuations observed during states of wakefulness and sleep were comparable to those reported for mammalian species during similar behavioral states. Biphasic blood pressure fluctuations induced by the injection of eserine were not related to the drug induced electroencephalogram and behavioral sleeplike state. - *Authors' summary*.

434. Amirov, N. S. (Institute of Normal and Pathological Physiology of the Academy of Medical Sciences, Moscow, U.S.S.R.). 1966. *Method for repeated sampling of blood from the portal vein* (in Russian). *Fiziol. Zh. SSSR* 52: 312-313.

Sampling of blood from the portal vein of dogs requires a puncture of the vessel. Repeated punctures over a short period of time usually results in serious damage to the vein and leads to thrombosis. A method for repeated sampling of portal blood that requires only one puncture of the vein is described. The technique involves the surgical placement of a split polyethylene T-tube around a section of the portal vein with the free perpendicular section of the tube extending through a cannula placed in the

abdominal wall. Approximately two weeks after implant the portion of the tube around the vein is firmly encapsulated. Heparin is administered and the portal vein is punctured by means of a long needle placed through the lumen of the protruding T-tube. A syringe is connected to the end of the tube and blood is withdrawn. - C. M. Poole.

435. Baer, G. M. (Southwest Rabies Investigations Station, Communicable Disease Center, University Park, New Mexico 88070). 1966. *A method for bleeding small bats*. J. Mammal. 47: 340.

A method is described for the bleeding of small bats from the orbital sinus. The author bled hundreds of Mexican free-tailed bats by this method without losing an animal. - W. G. Keenan.

436. Goldsmith, M. W. (Marischal College, Aberdeen, Scotland) and D. J. Parry. 1966. *Heparin-induced hypocalcaemia in rabbits*. Nature 210: 1286-1287.

Plasma calcium levels were determined on rabbit blood samples collected after intravenous injection of heparin and were compared to plasma calcium levels after *in vitro* addition of heparin to blood samples. The authors report that heparin, injected intravenously, appeared to cause an *in vitro* fall in plasma calcium levels. The estimated plasma calcium levels fell rapidly when samples were stored at 20 or 37 C, but not at 0 C. No fall in calcium level was observed when heparin was added to blood after removal from the animals. The authors suggest that *in vivo* injection of heparin causes the release of some factor from the vascular bed. This factor subsequently causes the build-up in the blood sample of a substance which can combine with calcium forming insoluble calcium soaps. This phenomenon is believed to be related to the release of lipoprotein lipase after heparin injection resulting in fatty acid saturation of the plasma proteins and an excess of free fatty acids which combine with the calcium. - D. V. Tolle.

437. Keighley, G. L. (California Institute of Technology, Pasadena, California 91109). 1966. *A device for intravenous injection of mice and rats*. Lab. Animal Care 16: 185-187.

A device is described which greatly simplifies intravenous, caudal injection of the mouse and rat. The tail to be injected is placed in a V-shaped slot and transilluminated from below. The lateral veins show clearly, even in mice and rats with darkly pigmented skin. Dimming the overhead room lights is helpful. The tails need not be clipped or shaved. - L. O. Bibbs.

438. Butler, E. Blanche (Johns Hopkins Hospital, Baltimore, Maryland 21205) and D. K. Watkins. 1966. *A micro-method for the estimation of blood volume*. Clin. Chim. Acta 13: 457-464.

A micromethod is described for the estimation of plasma volume using the iron-dextran complex, "Imferon". Reproducible recoveries of Imferon from plasma were obtained and its mixing time and rate of elimination from the

bloodstream were determined. The method was shown to give reproducible blood volumes in duplicate tests at one month's interval. - *Authors' summary modified.*

439. Klocke, F. J. (School of Medicine, State University of New York, Buffalo, New York 14214) and D. G. Greene. 1966. *Measurement of cardiac output with H_2* (abstract). Federation Proc. 25: 205.

The use of dissolved hydrogen (H_2) to determine cardiac output by the constant-rate-injection indicator-dilution technic was evaluated. Studies were performed in ten anesthetized closed-chest spontaneously ventilating dogs. In 50 consecutive simultaneous determinations, H_2 cardiac output averaged $98\% \pm 9.3\%$ of conventional dye dilution cardiac output. In 15 similar comparisons with the Fick method, H_2 cardiac output averaged $101\% \pm 9\%$ of Fick cardiac output. Measurements of intravascular H_2 concentration have proven feasible at 10-15 second intervals and, using a platinum electrode, this parameter has also been recorded continuously. It is concluded that dissolved H_2 is a useful indicator for repeated determinations of cardiac output at short intervals over an extended period of time. - *Authors' summary modified.*

440. Clarke, D. E. (Bradford Institute of Technology, Bradford 7, Yorkshire, England), A. Hiscoe, L. N. Hulley, K. Jackson, and G. D. H. Leach. 1966. *A transistorised impulse generator for recording the heart rate from intact and isolated preparations.* J. Pharm. Pharmacol. 18: 49-57.

A method for presenting the heart rate from intact and isolated preparations as a kymographic record is described. A transistorized impulse generator with either an integral or independent power supply is used to activate a Thorp impulse counter. The ability of the instrument to follow a wide range of heart rate changes and to measure rates in the usually encountered laboratory species is demonstrated. - *Authors' summary.*

441. Selezneva, S. A. (Djenalidze Research Institute of Emergency Aid, Leningrad, U.S.S.R.) and L. G. Vaniukov. 1966. *Acryl plastic illumination channels for intravital microscopic examination of animal tissues* (in Russian). Fiziol. Zh. SSSR 52: 604-606.

Intravital microscopy of vessels is one of the principal methods for the investigation of the microcirculation. In some cases the organs or tissues have to be studied without changing their position. In these cases illumination channels are used for transillumination. Illumination channels usually consist of quartz rods, however, these have serious disadvantages. This paper describes illumination channels made of transparent, colorless methylmethacrylate. They are easily manufactured and can be given any desired shape. Their cross-section can be modified to produce a high concentration of light from a low-powered source. Two types of these illumination channels are described. - *C. M. Poole.*

442. Gessner, U. (Johns Hopkins School of Medicine, Baltimore, Maryland 21205) and D. H. Bergel. 1966. *Methods of determining the distensibility of blood vessels*. IEEE Trans. Bio-Med. Electron. 13: 2-10.

Methods of calculating the characteristic transmission parameters of arterial segments, which are very short compared to the wavelength, are presented. If the reflection coefficient is known (e.g., as with complete occlusion) two simultaneous measurements of pressure or flow suffice. If this is not known, as is generally the case, three measurements must be made. In either case, provided great attention is paid to the static and dynamic calibrations of the instruments, the results obtained are wholly reasonable and allow an estimation of vessel distensibility, and also a closer examination of the usefulness of various transmission-line hypotheses. - *Authors' summary*.

443. Reber, K. (F. Hoffmann-La Roche & Co. Ltd., Basle, Switzerland). 1966. *A device for the production of well-defined lesions of mesenteric blood vessels with resulting platelet thrombi*. Throm. Diath. Haemorrhag. 15: 471-475.

Well-defined lesions of mesenteric blood vessels with resulting platelet thrombi are produced in a reproducible manner by electric stimulation with a microelectrode under microscopic observation. The apparatus used and the results obtained are described. - *Author's summary*.

EXPOSURE, RESTRAINT, ACTIVITY DEVICES

444. Aftonomos, B. T. (University of Nebraska, Omaha, Nebraska 68105), P. M. St. Aubin, and J. F. Foley. 1966. *Design of a versatile hyperbaric chamber assembly for the study of small animals and cell cultures*. Life Sci. 5: 899-904.

A description is given of a hyperbaric chamber used in the investigation of the potentiating effects of hyperbaric oxygen and actinomycin D on Ehrlich ascites tumor cells irradiated *in vivo*. The equipment was designed so that it could be used for a wide variety of studies. - *R. J. Flynn*.

445. Sheppard, H. A., Jr. (University of Texas Medical Branch, Galveston, Texas 77550). 1966. *Restraining board device for experiments with untrained, unanesthetized dogs*. Texas Rept. Biol. Med. 24: 228-230.

One of the factors that may modify the effects of drugs in an unanesthetized animal is the stress that may occur when the animal is restrained for long periods of time. To minimize this problem, a board was designed for the comfortable restraint of a dog for 5-8 or more hours without the necessity of prior training of the animal. The construction and use of this board are described. - *R. J. Flynn*.

446. Maletskos, C. J. (Cancer Research Institute, New England Deaconess Hospital, Boston, Massachusetts 02115) and N. C. Telles. 1966. *Restraining harness for dogs in metabolic studies involving radioactive materials*. Lab. Animal Care 16: 188-190.

A restraining harness is described for use with dogs in metabolic studies with radioactive material. The harness and caging technique allow for a complete separation of urine, by use of a catheter, and of feces. Contamination of either the excretion samples or the animal is prevented, while the animals are maintained in comfort over a period of days. - *Authors' summary*.

447. Pick, J. R. (School of Medicine, University of North Carolina, Chapel Hill, North Carolina 27515). 1966. *Restraint, blood collection and drug administration in birds*. Lab. Animal Digest 2: 3-5.

Techniques for handling, restraint, blood collection, drug administration and for producing surgical anesthesia in birds are described. The anatomic location and approach are described for both drug administration and blood collection via the jugular, alar, saphenous and femoral veins; carotid, brachial and femoral arteries, and the heart. Also given are techniques for oral and intramuscular administration of drugs. - *D. V. Tolle*.

448. Konishi, F. (Southern Illinois University, Carbondale, Illinois 62903). 1966. *Multiple exerciser for small laboratory animals*. J. Appl. Physiol. 21: 1083-1084.

A motor-driven treadmill was designed and constructed to exercise 16 rats individually or 32 rats in pairs, simultaneously. The belt speed can be varied from 30 to 108 ft/min by rotating a handle. The cost of constructing the treadmill was less than \$1000. - *Author's summary modified*.

449. Clostre, F. (Faculté de Médecine, Paris 15, France) and R. Rambert. 1966. *Matériel pour épreuve de travail musculaire chez le rat (Apparatus for muscular work trials in the rat)*. Pathol. Biol. 14: 450-452.

A rotating cylinder for muscular work studies in small animals is described. The apparatus may be operated at various speeds and several animals may be tested at one time. Provision is also made for the simultaneous collection of urine. - *R. J. Flynn*.

450. Bhatia, B. (Defence Institute of Physiology and Allied Sciences, Madras, India), N. Krishnaswamy, V. N. Rao, R. Venkataraju, and K. Prema. 1966. *A forelimbs treadmill for small animals*. J. Appl. Physiol. 21: 1087-1088.

A small belt-type treadmill is described which makes small animals run on their forelimbs only. Its small size enables the apparatus to be placed inside a glass desiccator for conducting decompression experiments. The running speed can be varied and the animals can be made to run continuously for prolonged periods. - *Authors' summary modified*.

451. Gans, C. (State University of New York, Buffalo, New York 14214). 1966. *An inexpensive arrangement of movie camera and electronic flash as a tool in the study of animal behaviour*. *Animal Behaviour* 14: 11-12.

A motion picture camera synchronized with an electronic flash and useful in the photography of small laboratory animals at relatively close distances is described. - T. E. Fritz.

452. Watzman, N. (School of Pharmacy, University of Pittsburgh, Pittsburgh, Pennsylvania 15213), H. Barry, III, W. J. Kinnard, Jr., and J. P. Buckley. 1966. *Repeated test of mice in the photocell activity cage after different time intervals*. *J. Pharm. Sci.* 55: 518-521.

A total of 384 mice, given two-hour tests twice in the photocell activity cage under the same conditions, showed lower activity scores (with square root transformation) in the second test. This behavioral carry-over effect was greater for subgroups given the second test at an interval of one or three, instead of seven or 14 days, after the first. Chlorpromazine produced a greater decrement in activity in the first 0.5 hr of the second test than of the first. In both tests, aggregations of five, rather than single animals, showed a greater drug decrement in the first hour and some recovery from the drug effect in the last 0.5 hr. The most stable data were obtained in the first 0.5 hr. A high correlation between tests, especially with a one-day interval, indicated that a repeated-test design can provide a sensitive measure of drug effects. - *Authors' summary*.

453. Mundl, W. J. (Allan Memorial Institute, McGill University, Montreal, Quebec, Canada). 1966. *Activity of small animals measured with accelerometer*. *Med. Biol. Eng.* 4: 209-212.

A measuring system for recording small animal activity is described. The test system involves a spring-suspended cage floor and crystal-type accelerometer transmitter. The system was shown to be sensitive and reliable even with relatively short trial times (20 minutes). - D. V. Tolle.

454. Benjamin, J. M., Jr. (Lehigh University, Bethlehem, Pennsylvania 18018), R. M. Rauch, S. J. Harris, and S. Weinstock. 1966. *A system for recording the order and duration of an animal's path in a runway*. *J. New Drugs* 6: 128-130.

An apparatus is described which was developed to investigate the behavior of rats in straight alleyways. The equipment represents a semi-automated system for obtaining a record of the animal's path in the alleyway and a record of duration of successive locomotor movements. The apparatus involves a 20-channel "contact" recorder in which one of the animal's rear paws serves to key a thyratron circuit which records location. The contact simultaneously activates another signal which records the duration of the movements. - C. M. Poole.

455. Bridges, C. C. (Texas Christian University, Fort Worth, Texas 76129). 1966. *All-electric recording in a straight alley*. J. New Drugs 6: 131-133.

An electronic device is described for continuous recording of an animal's position in a straight runway. It functions as a simple voltage divider with the moving animal acting as the variable contact of a potentiometer. The apparatus avoids some of the disadvantages associated with strain-gauge systems and produces consistent results. - C. M. Poole.

456. Shillito, Elizabeth E. (Agricultural Research Council Institute for Animal Physiology, Babraham, Cambridge, England). 1966. *A method for recording the effect of drugs on the activity of small mammals over long periods of time*. Brit. J. Pharmacol. 26: 248-255.

A method is described for recording the activity of a group of small mammals as they live permanently in an area. The method utilizes a vertical wall cage made from galvanized sheet steel. It consists of eight units, one on top of each other. Each unit consists of a nest box connected to a feeding chamber by two runs. The runs of each unit are connected by holes so that the animals can climb up and down the whole enclosed area. The movement of the animals is recorded by a capacitor system. Six probes are placed in the control area of the cage, under some of the holes in the runs through which the animals climb. When an animal goes near or past a probe, it alters the capacitance of the probe which unbalances an electric circuit and a dot is made on a moving graphite-backed recording paper. There is a time recorder incorporated in the writing mechanism so that the activity of the animals within the cage is sampled in relation to time. The effect of some standard compounds on the activity of mice living in this way is recorded, and the significance of these results is discussed. - R. J. Flynn.

457. Klygul, T. A. (Institut Framakologii i Khimioterapii, Moscow, U.S.S.R) and V. A. Krivopalov. 1966. *A technique for the automatic recording of the behavior of rats for the experimental evaluation of the effects of tranquilizers* (in Russian). Farmakol. Toksikol. 29: 241-244.

A method is described for the automatic recording of the behavior of rats. The described procedure is useful for the determination of the specificity of the effects of meprobamate-like substances in contrast with muscular relaxants of the mephenesin type and of neuroleptics. The method can also be used for the detection and evaluation of the ataractic properties of new compounds. - R. J. Flynn.

458. Deutsch, J. A. (New York University, New York, New York 10003). 1966. *A sensitive electronic drinkometer*. J. Exptl. Anal. Behavior 9: 265-266.

This paper describes an electronic device of simple design which allows rates of drinking in animals to be measured while passing the minimum of current through the subject. The device employs a gas filled tetrode (2D21) and a standard relay. The usual current drawn by the animal is less than 0.1 μ amp. The model will work even when smaller currents are desired. In

spite of the extreme sensitivity of the circuit, the device is robust and reliable in practice. It can also be used as a sensitive touch relay. - W. G. Keenan.

459. Deutsch, J. A. (New York University, New York, New York 10003). 1966. *An electromechanical drinkometer*. J. Exptl. Anal. Behavior 9: 264.

An electromechanical drinkometer is described which is inexpensive and easily made with a minimum of tools and materials. It is equal in reliability to electronic drinkometers and has the added advantage that it does not pass a current through the animal. - W. G. Keenan.

460. Mundl, W. J. (McGill University, Montreal, Quebec, Canada). 1966. *An electrical drinking spout for small animals*. J. New Drugs 6: 134-135.

The use of an electrified drinking spout to administer mouth shock as punishment in passive avoidance experiments is complicated by the tedious task of counting the number of shocks and correctly judging "pseudo-responses." An electronic device is described which utilizes an induced voltage that occurs when the animal completes the shock circuit. This device greatly simplified data collection. Extensive use of it has shown it to be reliable. - C. M. Poole.

OTHER SAMPLING, MEASURING AND RECORDING TECHNIQUES

461. Lomax, P. (School of Medicine, University of California, Los Angeles, California 90024). 1966. *Measurement of 'core' temperature in the rat*. Nature 210: 854-855.

"Core" temperature measurements in the rat may show considerable variation depending on the distance to which the thermometer is inserted into the rectum. The author reports core temperatures made with a thermistor probe and tele-thermometer sensitive to 0.1 C. It was found that in the rat, core temperature readings fall off rapidly at distance of less than 5 cm from the anal sphincter. At distances of 3 cm slight variations in body position produced considerable changes in the temperature readings. The authors conclude that the most simple, accurate and reliable method of recording core temperature in the conscious rat is by means of a probe inserted at least 6 cm into the rectum and left in position throughout the experiment. - D. V. Tolle.

462. Brown, B. H. (Regional Medical Physics Department, 21 Claremont Crescent, Yorkshire, England). 1966. *Some new instruments for the continuous monitoring of body temperature, respiration-rate and pulse-rate*. Phys. Med. Biol. 11: 135-137.

Battery operated instruments to measure body temperature, respiration rate and pulse rate, and to display the outputs on a meter, are described. - R. J. Flynn.

463. Lutsky, I. (Marquette University School of Medicine, Milwaukee, Wisconsin 53233), W. E. Evans, and K. L. Kayser. 1966. *Estimating time of death in dogs*. Am. J. Surg. 111: 846-850.

A method for estimating the time of death in laboratory canines is described. In practice, it depends on accurately measuring at least two postmortem rectal temperatures over a period of several hours. Utilizing the percentage cooling rate, which compensates for inherent differences in heat loss due to weight, hair coat, state of nutrition, and the like, this method can be used in determining the elapsed time since death provided the atmospheric temperature remains relatively constant and the cooling body is not moved. This method requires no complex equipment and can be performed by nonspecialized personnel. - *Authors' summary*.

464. Waggoner, W. C. (Colgate-Palmolive Research Center, Piscataway, New Jersey 08873), T. J. Russell, and E. B. Gasser. 1966. *Data acquisition and processing system for animal toxicology* (abstract). Federation Proc. 25: 447.

An electronic interface, which couples a scale and computer tape or card output device, has been effectively used for rat toxicology data acquisition. A plastic card, which is kept with the cage and holds coded information, is inserted into and read by the interface. Rat and food weights are consecutively read before proceeding to the next card. Paper tape output is processed by a digital computer utilizing FORTRAN. The rat program, in addition to tabular listing of rat number, weight, and food and drug consumed, calculates growth coefficients, predicted drug intakes, food batch assignment, food dosage, batch concentration, and directions for mixing forthcoming drug-food requirements. When a preferred feeding drug level is initially specified, the computer calculates the actual drug feeding level. The system is designed to minimize errors and maximize efficiency and accuracy in toxicology feeding experiments. - *Authors' summary modified*.

465. Norman, B. B. (College of Veterinary Medicine, Oklahoma State University, Stillwater, Oklahoma 74074), E. W. Jones, and W. E. Brock. 1966. *A system for assembling hematologic data for computer analysis*. Am. J. Vet. Res. 27: 829-832.

A method of assembling hematologic data for computer analysis is described. The method was used during a study of bovine anaplasmosis. The course of the disease syndrome was divided into specific phases to assist analysis and to minimize computer time. - *Authors' summary*.

466. Warner, H. R. (325 Eight Avenue, Salt Lake City, Utah 84103). 1966. *The role of computers in medical research*. J. Am. Med. Assoc. 196: 944-949.

The computer represents a major new tool for medical research. It is a means for rapid analysis and display of experimental data to the researcher during the course of his experiment in order to optimize his chances of making significant associations and exploring new leads. The computer can also be used as a tool for testing theory against experiment by the devising

of mathematical models whose solutions can be compared with experimental data. An example is a simple model which permits estimation of stroke volume, heart rate, cardiac output, mean pressure, and resistance continuously from direct input of a signal from a pressure transducer recording central aortic pressure and display of these variables on a memory oscilloscope in the laboratory. It is doubtful that any other tool can affect so many areas of medical research in such a fundamental way. - *Author's summary.*

467. Hicks, G. P. (1300 University Ave., Madison, Wisconsin 53706), Mona M. Gieschen, W. V. Slack, and F. C. Larson. 1966. *Routine use of a small digital computer in the clinical laboratory.* J. Am. Med. Assoc. 196: 973-978.

A small, inexpensive high-speed digital computer has been used to assist the technologist directly in the calculation and collection of laboratory test results. If the computer is programmed in the conversational mode, it can be used by all laboratory personnel without any knowledge of computer technology. Data collected by the computer are used to generate laboratory reports. The data are also stored for subsequent preparation of census reports and statistical analyses such as the calculation of averages, standard deviation, and histograms. - *Authors' summary.*

468. Castleberry, M. W. (Fitzsimons General Hospital, Denver, Colorado 80240), E. D. Jenkins, and S. W. Thompson II. 1966. *Use of the electronic computer in retrieval of veterinary pathologic data.* Am. J. Vet. Res. 27: 824-829.

The use of an electronic computer in an experimental pathology laboratory to retrieve data on accessions was studied. Separate lists or codes were made for anatomical sites, pathologic changes, and case identifying data. Individual entries were numerically designated with the exception of the sensing symbol and sex, which were alphabetically identified. A 21-digit format was developed to program computer input and interrogation. Four hundred case records (accessions) were coded. The information was stored in a computer data record, and the machine subsequently was interrogated with questions having known answers. Answers, in the form of case accession numbers, were quickly and accurately obtained. It is believed this data retrieval system has applicability to large, lifescience research centers or groups having access to an electronic computer. - *Authors' summary.*

AUTHOR INDEX

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